

Brain Drain, Brain Gain: Accessing the Required Skills

Report prepared for the Minerals Council of Australia

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Executive Summary

This report assesses the role played by overseas migrants in the mining industry over the past decade and the potential under the existing permanent and temporary entry visa subclasses for migration to contribute to current skill shortages in the industry.

Employment in the mining industry has grown by 59 per cent over the period August 2001 to August 2005. This massive growth occurred in a context of rapid growth in construction employment Australia-wide over the same period of 30 per cent – thus putting enormous pressure on skill availability in occupations which both industries depend on (like mobile plant operators). By contrast, overall employment in Australia increased by 10 per cent.

Analysis of the main occupations of the mining industry shows that, aside from the mining-specific occupations of geology, mining engineering and metallurgy, drilling and mining, most employment in the industry is in fields like civil engineering, fitting and turning and mobile plant operators. The mining industry only employs a tiny proportion of those working in these occupations in Australia. In principle, with the exception of the mining-specific occupations, the mining industry should be able to draw most of its skill needs from other industries in Australia – so long as it is prepared to pay the price to attract such workers to work in remote areas. This is a crucial qualification since only 30 per cent of mining employment is located in the five major metropolises of Australia and less in the case of most of the trade and semi-skilled positions.

In practice, employers usually seek persons with mining industry experience. This applies across the spectrum of professional, trade and semi-skilled areas and thus makes the task of filling vacancies particularly difficult. Migrants with the skills and experience offer one option to fill the gap.

The data on the role of migrants in the mining industry show that they have not, in the past, played an important part. As of 2005, some 19 per cent of the employed mining industry workforce was born overseas compared with 25 per cent of all employed workers in Australia. This situation has not changed with the rapid growth in mining employment since 2001. Migrants arriving in Australia since 2001 made up 1.8 per cent of the employed mining workforce as of August 2005 compared with three per cent of the total Australian employed workforce.

Migrants have made their greatest contribution in the managerial and professional ranks of the mining industry. The share drops sharply in relation to the trade and semi-skilled ranks. The largest source countries have been the United Kingdom and New Zealand, which, as of 2001, respectively made up 7.2 per cent and 3.2 per cent of mining employment. By comparison, at this time persons born across all of Asia made up 2.5 per cent of the mining workforce.

The study examined recent arrival and visa-issued data in order to assess the extent to which persons with mining-specific skills have entered Australia since 2001 and, if so, in what visa categories. The conclusion was that relatively few such skills were being attracted under the General Skill Migration (GSM) categories and that there has been little increase in the numbers over the last few years. In the case of the semi-skilled

occupations, it is largely because persons in these fields are not eligible. The report concludes that it is unlikely that any further expansion in the GSM will contribute much to the mining industry because the skill spread under the visas is focussed around professions and trades other than those specific to mining and because most of those attracted settle in Australia's major metropolitan areas. This conclusion also applied to the permanent-entry employment nomination and the various state-specific and regional permanent-entry visas, including the State/Territory Nominated Independent (STNI), Skilled Independent Regional (SIR) and Skilled Designated Area Sponsored (SDAS) visa subclasses. The STNI and SIR involve state government sponsorship. Of the two largest, the STNI allows those sponsored to settle anywhere in the sponsoring state and the SDAS allows those sponsored by Melbourne relatives to live in Melbourne.

Mining employers can utilise the Regional Sponsored Migration Scheme (RSMS) which allows regional employers to sponsor skilled migrants on a concessional basis (compared to the Employment Nomination Scheme (ENS) visa category). Unlike the ENS, under 'exceptional circumstances' semi-skilled workers can be sponsored under the RSMS scheme. In practice, employers have not done so because of the advantages of using the temporary-entry visa subclasses.

There was more evidence of mining-specific recruitment in the temporary-entry visa subclasses (visa category 457). These offer the opportunity for employers to recruit persons with managerial, professional and trade-level skills to specific jobs without the necessity for the employer to prove that local aspirants are available. Nor do sponsored persons have to have their credentials approved by Australian credential authorities (as is the case for migrants entering under the GSM categories.) Those sponsored also cannot leave their employment without prejudicing their rights to stay in Australia. The numbers of mining-specific skilled entering Australia under the 457 visa were much greater than under the permanent-entry categories. Most of those sponsored were managerial and professional personnel. Relatively few were at the trade level and almost none were semi-skilled. The numbers sponsored have not grown significantly over the past few years.

The net effect of permanent and long-term temporary movements in the mining industry occupations, including movements of Australian residents, is a modest brain gain for Australia.

Recent experience suggests that the mining industry is making greater use of temporary-entry sponsorship provisions. However, the analysis of the visa subclasses which can be used for such sponsorships indicates that they do satisfactorily serve mining industry needs. The 457 business long stay visa is working well for firms wishing to sponsor highly skilled managerial and professional personnel on temporary contracts, but it is not available for semi-skilled construction or mining workers. One option is the Labour Agreement provision which enables employers to sponsor migrants down to level 7 of the Australian Standard Classification of Occupations (ASCO) under the 457 visa. One condition of this visa is that the employer commits to an associated training program for domestic workers. This is appropriate where the jobs involve ongoing work during the production phase of a mines life. Such Agreements are not suited to the construction and set up phase of mining projects where there is no ongoing employment.

It is proposed that the Department of Immigration and Multicultural Affairs (DIMA) establish a new visa category which would permit accredited sponsors to bring groups of skilled and semi-skilled workers to Australia on contracts of up to two years duration. The visa would only be available in regional areas and would require payment of the wage rates prevailing in the relevant industry. There would be no training requirements linked to the sponsorship. The workers sponsored would be required to leave Australia at the completion of their work contract. The visa would be suitable for firms subcontracting on behalf of mining enterprises to build components of new mines and associated infrastructure. It would permit such firms to draw skilled and semi-skilled workers from Asian migrant workers who, for example, had relevant construction experience in the Gulf States.

It is also proposed that competency-based testing be put on the skills planning agenda so as to widen the field of those available for entry as potential tradespersons. Currently the Trades Recognition Authority limits its assessments of tradespersons to paper-based documentation. For the future it is likely that tradespersons will have to be drawn from new sources where the British apprenticeship system does not prevail. For these sources, the diversity of pathways into trade-level skills will require competency based assessment in order to ensure that Australian standards are met. This proposal will involve sending Australian trades assessors to potential source countries to conduct these competency tests.

In regard to training issues, there is an urgent need for additional university places in engineering. Analysis of recent enrolment levels of domestic and overseas students showed that all the recent increases in engineering training in Australia were attributable to increased overseas student numbers. Very few overseas students are doing mining engineering. It is recommended that the mining industry, in association with Commonwealth and State governments and universities, help finance additional HECS-funded undergraduate places for domestic students in engineering fields relevant to the mining industry.

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Introduction

The mining industry currently faces a situation of severe shortages of persons who have the skills needed in its workforce. Given the number of new mining projects at various stages of development, it is certain that the industry will require a further major infusion of workers.¹ The objective of this study is to review the extent to which Australia's skilled migration system is contributing to the workforce of the Australian minerals industry and to provide advice on initiatives which might improve this contribution.

The report begins with an analysis of the mining industry workforce with particular reference to the role of migrants. Much of this analysis is based on detail drawn from the 1996 and 2001 Censuses. It will be no surprise that there was relatively limited recruitment of migrants into the industry during the late 1990s, since this was not a period of rapid growth in the industry. The report then examines the available data on migration and the mining industry workforce for the period since 2001. Though there are limitations to this data, we conclude that, notwithstanding the recent boom in the mining industry, migration has not contributed significantly to its workforce. We then ask related questions about the level of training of mining personnel, particularly those at the professional level. This too appears to have not expanded much despite major shortages of mining industry professionals. The review of this information sets the scene for the articulation of migration and educational policy options.

Background: the mining industry workforce

The number of persons employed in the mining industry in Australia (and its major component – the mineral industry) is small. At the time of the 2001 Census there were 75,362 persons employed in the mining industry. As indicated in Table 1, employed levels contracted between 1996 and 2001. Since 2001 there has been a sharp rise in employment that reflected boom conditions in the industry over the last few years. According to ABS Labour Force Survey estimates there were 123.9 thousand persons employed in the mining and oil and gas industries as of August 2005. Despite this increase, the numbers employed in mining were very small relative to the total employed workforce in Australia as of August 2005 of just over nine million.

The main occupations of persons employed in the mining industry as recorded in the 2001 and 1996 Censuses are also shown in Table 1. The major occupational group amongst skilled employees is tradespersons. They made up 15,175 out of the total employed workforce of 75,362 in 2001. Within this category, the biggest groups are metal fitters and machinists (5,971 persons), and electricians (2,069) (see Table 2). These are not mining-specific occupations. Mining-specific occupations are more evident amongst the 11,527 professionals where geologists and geophysicists, and mining and material engineers, make up an important component of the workforce (see Table 2). The picture changes when the largest component of mining workforce is examined. This is the immediate production and transport group in which 24,800

were employed in 2001. The largest of this group are miners² (14,317) whose skills are obviously specific to the mining industry. This is less likely to be the case with others in the semi-skilled group which include plant operators, and truck drivers. (For a detailed occupational breakdown of the mining industry sectors for 1996 and 2001, see Appendix I.)

Table 1: Persons employed in the mining industry by industry sector and occupation, 1996 and 2001, number and change 1996-2001

	1996	2001	Change
Industry sectors			
110 Coal Mining	24,481	18,908	-5,573
120 Oil & Gas Extraction	3,318	5,118	1,800
130 Metal Ore Mining	26,838	30,076	3,238
140 Other Mining	9,615	7,181	-2,434
150 Services to Mining	15,028	10,136	-4,892
B000 Mining, undef	6,913	3,943	-2,970
Total employed persons	86,193	75,362	-10,831
Broad occupations			
Managers & Administrators	6,406	6,411	5
Professionals	11,387	11,527	140
Associate Professionals	7,734	7,759	25
Tradespersons	19,073	15,175	-3,898
Advanced & Intermediate Sales, Service, Clerical Workers	6,773	5,541	-1,232
Intermediate Production & Transport Workers	28,419	24,800	-3,619
Elementary Sales, Service & Clerical Workers	539	493	-46
Labourers & Related Workers	4,449	2,942	-1,507
Other	1,413	714	-699
Total employed persons	86,193	75,362	-10,831

Source: Australian Bureau of Statistics (ABS), Censuses 1996 and 2001

Table 2: Numbers employed in mining and other industries by occupation, and mining industry as a proportion of all persons employed in Australia, 2001

Occupation (ASCO code and name)	Mining	Other industry	Total	% mining
1222 Production Managers	2,738	37,471	40,209	7
1999 Managers & Administrators	3,673	720,981	724,654	1
2112 Geologists and Geophysicists	2,423	2,667	5,090	48
2123 Cartographers & Surveyors	546	7,177	7,723	7
2127 Mining & Materials Engineers	1,568	1,657	3,225	49
2129 Other Building & Engineering Professionals	1,549	77,702	79,251	2
Other Professionals	5,441	1,413,273	1,418,714	0
3112 Science Technical Officers	558	14,841	15,399	4
3129 Building & Engineering Assoc Professionals	4296	75,015	79,311	5
Other Associate Professionals	2905	878,593	881,498	0
4112 Metal Fitters & Machinists	5,971	67,076	73,047	8
4986 Drillers	2,275	1,799	4,074	56
Other Tradespersons	6,929	934,857	941,786	1
7111 Mobile Construction Plant Operators	1,879	30,999	32,878	6
7123 Engineering Production Systems Workers	1,661	18,439	20,100	8
7311 Truck Drivers	2,174	108,825	110,999	2
7911 Miners	14,317	2,689	17,006	84
Other Intermediate Production & Transport Workers	4,769	485,244	490,013	1
Clerical, Sales & Service Workers	6,034	2,463,602	2,469,636	0
9911 Mine Support Workers & Drillers Assistants	1,375	1,050	2,425	57
Other Labourers	1,567	713,793	715,360	0
Inadequately described/not stated	714	94,232	94,946	1
Total	75,362	8,151,982	8,227,344	1

Source: Australian Bureau of Statistics, Census of Population and Housing, 2001, customised matrix

In the broadest terms, the mining industry workforce can be divided into two groups: those occupations which are based on generic skills (like the fitters and turners), and those which are mining specific, which include some specialist professionals and much of the semi-skilled labouring workforce. In the case of those with generic skills, the mining industry only accounts for a tiny share of the total number of persons working in Australia in the respective occupations. These fractions are shown in Table 2. For example, the 5,971 metal fitters and machinists employed in the mining industry constituted eight per cent of the total number of persons employed in this occupation. On the other hand, the mining industry was the main employer of geologists (48 per cent), mining and material engineers (49 per cent), drillers (56 per cent) and miners (84 per cent).

Current skill shortages

An examination of recent data on skill shortages in the mining industry suggests that both persons possessing generic and persons possessing mining-specific skills are in short supply. For example, in the case of the trades, the NCVET and NLS 2005 report *Prospecting for Skills*³ indicates that the key skill shortages were amongst mechanical-fitters, the electrical trades, boilermakers, jumbo drill operators, skilled miners, general mine operators, process technicians, explosives operators, truck drivers, dragline operators, technical and computing personnel (especially diagnosis of equipment faults) and ventilation officers.

The reason for exploring the generic/mining-specific division of skills is that it was initially expected that quite different recruitment policies would apply to the two streams. In principle, those with generic skills like mechanical fitters could be drawn from the ranks of such tradespersons currently or recently employed in manufacturing industries elsewhere in Australia to fill mining industry vacancies. This would imply that migration would be an unlikely preferred option. This point would seem to apply particularly to semi-skilled workers such as plant operators. To bring such persons from overseas would imply substantial expense, far greater than whatever expense it would take to attract plant operators from other employment in Australia. For the high level mining-specific skills, migration would seem to be an option, especially where a substantial period of training was involved (as with mining engineers). The migration option would appear to be less appealing for semi-skilled mining specific occupations since the option of on-the-job training should generally be available for locals.

However, in the real world of mining industry recruitment, this division into two streams was not so clear cut. The study team examined recent job vacancy data for the mining industry. As of 13 February 2006 the web-based job search organisation seek.com.au listed 1,943 vacancies in its mining category (excluding oil and gas). Both industry-specific and generic skills were in demand. Engineers were heavily in demand, usually with mining engineering experience being a requirement. So too were various mining-specific occupations such as drillers (40) and geoscientists (161). There were a large number of tradesperson vacancies (particularly electricians, fitters, boilermakers and diesel mechanics). But, in both streams, mining-specific experience was usually required. Mining employers clearly expect their fitters and electricians (among others) to be job ready, which invariably seems to mean the possession of work experience in the mining industry.

Location of the mining industry work force: where the skills are needed

As shown in Table 3, the increase in the mining industry workforce between 2001 and 2005 occurred mainly in Western Australia and Queensland, with additions of nearly 20,000 people in Western Australia and 16,500 in Queensland. Victoria and South Australia had large increases in percentage terms from a small base.

Table 3: The mining industry workforce by State/Territory, August 2001-August 2005

State/Territory	Aug. 2001	Aug. 2005	Increase	
	('000)	('000)	('000)	%
New South Wales	19.4	19.4	0	0
Victoria	3.9	8.8	4.9	127
Queensland	19.5	35.9	16.5	85
South Australia	4.6	8.6	3.9	84
Western Australia	27.8	47.7	19.8	71
Tasmania	1.7	2.1	0.4	23
Northern Territory	0.8	1.3	0.5	63
ACT	0	0	0	0
Australia	77.8	123.9	46.1	59

Source: ABS, Labour Force Survey

Table 4: Residential location of persons employed in the mining industry by occupation and capital city and rest of State, five mainland states, 2001

Occupation	Residential location (% of persons, all Australia)										Number of persons, all Australia *	
	Syd-ney	Rest of NSW	Mel-bourne	Rest of Vic	Bris-bane	Rest of Qld	Ade-laid-e	Rest of SA	Pert-h	Rest of WA		Five metr-o. areas
Production Managers	4	17	3	5	5	19	2	3	18	20	32	2,738
Managers & Administrators	7	9	11	2	11	10	4	1	32	9	65	3,673
Geologists and Geophysicists	4	5	5	2	7	8	7	1	40	16	63	2,423
Cartographers & Surveyors	2	15	0	2	6	17	1	3	25	25	34	546
Mining & Materials Engineers	3	15	2	2	8	17	4	2	27	17	44	1,568
Other Building & Engineering Prof	4	14	5	1	9	15	3	2	27	16	48	1,549
Other Professionals	4	7	10	2	9	12	4	2	31	16	58	5,441
Science Technical Officers	1	11	1	3	4	17	2	2	26	30	34	558
Building & Engineering Assoc Prof	2	25	1	2	2	19	2	2	15	26	22	4,296
Other Assoc Prof	3	10	7	3	8	16	3	3	27	16	48	2,905
Metal Fitters & Machinists	2	22	1	2	2	27	1	2	11	25	17	5,971
Drillers	1	10	1	5	3	21	2	4	20	27	27	2,275
Other Tradespersons	2	18	1	4	3	23	3	4	13	24	22	6,929
Mobile Construction Plant Operators	3	18	3	7	5	28	1	4	8	19	20	1,879
Engineering Prodn Systems Wkrs	2	13	1	3	1	18	0	7	15	33	19	1,661
Truck Drivers	4	15	4	6	3	24	1	5	9	23	21	2,174
Miners	2	29	0	1	1	31	0	3	7	20	10	14,317
Other Intermed Prodn & Tspt Wkrs	2	12	3	6	3	19	1	4	13	30	22	4,769
Clerical, Sales & Service	4	9	7	3	9	13	5	2	28	15	53	6,034
Mine Supp Wkrs & Drillers Assts	2	13	1	5	2	27	2	2	17	23	24	1,375
Other Labourers	3	11	3	5	3	19	3	4	15	28	27	1,567
Inadequately described/not stated	2	16	2	3	2	21	3	5	16	21	25	714
Total	3	17	3	3	4	21	2	3	18	21	30	75,362

* Total includes Tasmania, Northern Territory each of which accounted for 2% of mining employment and the ACT and Other Territories (Christmas Island etc)

Source: Australian Bureau of Statistics, Census of Population and Housing, 2001, customised matrix

A high proportion of those employed in the mining industry are located in non-metropolitan locations. This is shown in Table 4 which details the proportion of those employed in mining for the five mainland states of Australia by metropolitan and non-metropolitan location. The table also shows the total proportion located in the five metropolitan areas. This latter statistic indicates the division between managerial staff who are predominately metropolitan located, and the mining specific professionals (except geologists), trades and semi-skilled workers, who for the most part are located in non-metropolitan areas.

The role of migrants in the mining industry workforce

Given that most of those working in the mining industry were not in mining specific occupations like that of mining engineer, it would be surprising if migrants played a major role in the industry workforce. Also the regional location of much of the workforce implies a relatively low non-English-speaking background component, since the latter have a high propensity to locate near family and fellow ethnic community members, and thus are overwhelmingly concentrated in metropolitan areas. These expectations were confirmed by the available data.

According to the Australian Bureau of Statistics (ABS) Labour Force Survey, overseas-born persons make up 18 per cent (or 23,000) of the 123,900 persons employed in mining as of August 2005 (Table 5). By comparison, 25 per cent of all employed people in Australia in 2005 were overseas-born. These statistics indicate that the contribution of overseas migration to the mining industry workforce has been less than to the Australian workforce in general.

There are differences in the percentage of overseas-born people in the workforce in different parts of the industry. The percentage of migrants was highest in Services to Mining (23 per cent) and lowest in Coal Mining (14 per cent) according to the Labour Force Survey in 2005. Differences between the different types of mining were much larger in previous years. According to data from the 1996 and 2001 Censuses, 34 per cent of the workforce in Oil and Gas Extraction was overseas-born compared with 11 per cent in Coal Mining. Since 2001, the number of Australia-born workers has increased relative to the number of overseas-born workers in Oil and Gas Extraction and Services to Mining. The number of people employed in Services to Mining has doubled between 2001 and 2005, with most of the increase coming from the Australia-born rather than overseas-born (Table 5).

Another indication of the relatively limited role of migration in the mining industry is that only a small proportion of the recent growth in employment in the industry derived from newly arrived migrants. Just over 2,000 people out of the 123,900 people employed in the mining industry in August 2005 were migrants who had arrived since 2001. This is equivalent to just 1.8 per cent of all people employed in the mining industry, or 10 per cent of all the overseas-born people employed in the industry. By comparison, three per cent of all employed persons in Australia in August 2005 had arrived since 2001, as did seven per cent of the people employed in the Accommodation, Cafes and Restaurant industry, which has the highest percentage of recently arrived migrants.

Table 5: Persons employed in the mining industry, by birthplace, 1996, 2001 and 2005

	Birthplace			% overseas born
	Australia	Overseas	Total	
1996				
Coal mining	21,336	2,749	24,294	11
Oil and gas extraction	2,123	1,147	3,286	35
Metal ore mining	20,057	6,259	26,562	24
Other mining	7,600	1,873	9,606	19
Services to mining	10,596	4,208	14,949	28
Mining undefined	5,137	1,648	6,886	24
Total	66,849	17,884	85,583	21
2001				
Coal mining	16,422	2,045	18,714	11
Oil and gas extraction	3,237	1,718	5,010	34
Metal ore mining	22,679	6,717	29,716	23
Other mining	5,675	1,335	7,106	19
Services to mining	6,979	2,879	9,987	29
Mining undefined	3,056	835	3,945	21
Total	58,048	15,529	74,478	21
2005				
Coal mining	23,900	3,800	27,700	14
Oil and gas extraction	6,100	1,300	7,400	18
Metal ore mining	32,800	8,400	41,200	20
Other mining	8,200	2,100	10,200	21
Services to mining	16,500	4,900	21,500	23
Mining undefined	13,500	2,400	15,900	15
Total	101,000	22,900	123,900	18

Sources: ABS: 1996 Census, 2001 Census, August 2005 Labour Force Survey.

Besides having a larger proportion of Australia-born persons than other industries, the mining industry also tends to employ more migrants of English-speaking background than other industries. Table 6 shows that migrants in the mining industry workforce were more likely to come from English-speaking countries such as New Zealand, UK and Ireland than from non-English speaking countries in Europe or Asia. The 2001 Census also showed that less than six per cent of persons employed in the mining industry spoke a language other than English at home compared with 15 per cent of all employed persons in Australia.

Table 6: Employed persons, mining industry by country or region of birth, 1996, 2001 and 2005, compared with all employed persons, 2005

Birthplace	Mining industry			All employed persons 2005
	1996	2001	2005	
Australia	78.1	77.9	81.5	75.1
New Zealand	4.5	4.7	3.2	2.7
UK, Ireland	8.6	8.3	7.2	6.5
Other Europe	3.8	3.0	2.6	4.5
Asia	1.8	1.9	2.5	6.9
North America	0.7	0.8	0.6	} 1.2
Other America	0.2	0.2		
Middle East & N. Africa	0.2	0.2		1.1
Other Africa	0.8	1.0	} 2.4	1.2
Other Oceania	0.4	0.4		0.8
Not stated/Inadequately described	1.0	1.2		-
Total	100.0	100.0	100.0	100.0

Sources: 1996 Census, 2001 Census, August 2005 Labour Force Survey

Table 7 shows the origins of migrants working in the different parts of the mining industry. Migrants working in Coal Mining tended to be from New Zealand, UK and other European countries. Half of the overseas-born employees in Oil and Gas Extraction were from the UK and Ireland. People working in Oil and Gas Extraction were more likely to come from North America and South Africa and less likely to come from New Zealand compared with the other parts of the industry. Metal Ore mining tended to have more migrants from New Zealand and South and Other Africa, while Other Mining employed the highest percentage of people of non-English speaking European background. The Services to Mining workforce had higher than average percentages of people from Southeast Asia, North America and South and Other Africa.

Table 7: Percentage distribution of the mining industry's overseas-born workforce by type of mining and birthplace, 2001

Birthplace	Coal mining	Oil and gas	Metal ore	Other mining	Services to mining	Mining undefined	Total
New Zealand	26.2	11.0	28.1	19.9	23.3	22.9	24.1
Other Oceania	2.4	0.5	1.8	1.6	1.9	3.4	1.9
UK, Ireland	41.7	50.0	38.6	31.0	40.0	35.9	39.8
Other Europe	16.7	13.5	13.3	27.1	10.0	15.1	14.6
Middle East, North Africa	0.9	1.4	1.0	0.4	1.1	1.1	1.0
Southeast Asia	2.2	5.4	4.5	10.3	6.5	5.3	5.2
Northeast Asia	2.2	1.3	1.0	0.3	1.9	1.8	1.4
South Asia	0.8	3.1	2.3	2.2	2.8	5.5	2.4
North America	3.0	6.5	2.9	1.5	6.1	3.8	3.8
Other America	0.9	1.6	1.1	0.9	0.6	1.8	1.0
South & Other Africa	3.1	5.7	5.3	3.6	5.6	3.6	4.9
Total	100.1	100.0	100.0	100.0	100.0	100.0	100.0
Number of people	2,045	1,718	6,717	1,335	2,879	835	15,529

Source: ABS, 2001 Census

Which occupations in the mining industry are migrants more likely to be found working in? Table 8 shows that the percentage of overseas-born people are higher in the managerial and professional occupations and lower in the trades and production and transport occupations. The 2001 Census showed that close to 40 per cent of engineering managers and policy and planning managers in the mining industry were overseas-born as were 34 per cent of geologists, geophysicists and civil engineers. Forty per cent of civil and mechanical engineering associate professionals were also born overseas. Tradespersons and miners were less likely to be born overseas and more likely to be Australia-born. Just 12 per cent of electricians and 15 per cent of metal fitters and miners working in the mining industry in 2001 were born overseas. The latter two occupational groups were the two largest in the mining industry.

For the most part, the migrants employed in the industry have been in Australia for some time. Table 9 shows that in the case of the geologists only 22 per cent had arrived since 1996 as had 24 per cent of the mining engineers. The percentage of recently arrived migrants was higher among managers and professionals. Forty per cent of overseas-born policy and planning managers and 35 per cent of overseas-born sales and marketing managers in the mining industry in 2001 had arrived after 1996, as had 25 to 30 per cent of overseas-born general and engineering managers. Only a small proportion of the overseas-born electricians, miners and metal fitters had arrived in Australia after 1996.

Table 8: Overseas-born workforce in the mining industry by occupation, 1996 and 2001

Occupation	% born overseas		Number overseas-born	
	1996	2001	1996	2001
General managers	33	36	216	250
Finance managers	31	29	118	117
HR managers	23	21	64	80
Engineering managers	32	39	69	121
Production managers	25	24	769	649
Supply & distribution managers	22	36	36	86
IT managers	30	34	26	63
Sales & marketing managers	35	29	81	106
Policy & planning managers	38	39	15	21
Other managers	28	31	357	347
Total managers	27	29	3,747	3,841
Geologists & geophysicists	35	34	993	828
Cartographers & surveyors	19	20	134	106
Civil engineers	32	34	40	77
Electrical & electronic engineers	26	33	103	98
Mechanical engineers	29	27	104	116
Mining engineers	33	32	408	495
Other engineers	31	28	505	459
Accountants	25	28	277	383
Computing professionals	35	32	236	212
HR professionals	22	22	157	154
Other professionals	28	28	451	481
Total professionals	30	30	3,408	3,409
Science technical officers	24	22	251	125
Surveying associate professionals	30	27	98	51
Civil & mechanical engineering assoc. professionals	29	40	71	39
Other building & engineering assoc. prof.	21	20	618	707
Policy & program administrators	26	28	161	243
Other associate professionals	25	25	651	640
Total associate professionals	24	23	1,850	1,805
Metal fitters	16	15	1,221	914
Steel & welding tradespersons	18	18	281	187
Electricians	14	12	479	298
Drillers	21	20	630	457
Chemical, petroleum & gas plant operators	27	28	120	174
Other tradespersons	23	23	536	605
Total tradespersons	18	18	3,267	2,635
Secretaries and personal assistants	24	24	492	363
General clerks	16	17	185	140
Stock & purchasing clerks	20	20	210	151
Other intermediate sales, service & clerical workers	22	25	563	618
Total intermediate sales, service & clerical workers	21	23	1,450	1,272
Intermediate plant, production & transport workers nfd	15	15	290	134
Mobile construction plant operators	15	15	403	280
Engineering production systems workers	16	17	299	292
Intermediate machine operators	17	21	591	169
Truck drivers	17	14	462	303
Miners	17	15	2,084	2,180
Storepersons	20	20	109	108
Other intermediate production & transport workers	24	19	666	473
Total intermediate production and transport workers	17	16	4,904	3,939
Elementary clerical, sales and service workers	20	26	109	119
Mining support workers & driller's assistants	18	14	109	195
Other labourers and workers	20	21	356	315
Total labourers	19	18	465	510
TOTAL ALL OCCUPATIONS	21	21	17,884	15,529

Sources: 1996 and 2001 Censuses

Table 9: Overseas-born workforce in the mining industry, 2001, by occupation and period of arrival

Occupation	% arriving	
	before 1996	1996-2001
General managers	72	25
Finance managers	73	27
HR managers	81	16
Engineering managers	70	30
Production managers	84	12
Supply & distribution managers	85	12
IT managers	83	17
Sales & marketing managers	62	36
Policy & planning managers	60	40
Other managers	79	18
Total managers	78	19
Geologists & geophysicists	77	22
Cartographers & surveyors	97	0
Civil engineers	83	17
Electrical & electronic engineers	87	10
Mechanical engineers	71	22
Mining engineers	74	24
Other engineers	78	19
Accountants	78	20
Computing professionals	81	19
HR professionals	88	10
Other professionals	82	15
Total professionals	79	19
Science technical officers	88	12
Surveying associate professionals	95	5
Civil engineering assoc. professionals	100	0
Mechanical engineering assoc. prof.	100	0
Other building & engineering assoc. prof.	92	5
Policy & program administrators	78	18
Other associate professionals	86	11
Total associate professionals	88	9
Metal fitters	89	9
Steel & welding tradespersons	87	9
Electricians	88	9
Drillers	84	8
Chemical, petroleum & gas plant operators	87	13
Other tradespersons	90	12
Total tradespersons	88	9
Secretaries and personal assistants	84	11
General clerks	87	11
Stock & purchasing clerks	91	6
Other intermediate sales, service & clerical workers	84	13
Total intermediate sales, service & clerical workers	85	11
Intermediate production & transport workers nfd	80	12
Intermediate plant operators nfd	91	5
Mobile construction plant operators	86	13
Engineering production systems workers	88	9
Intermediate machine operators	85	10
Truck drivers	82	14
Miners	87	8
Storepersons	94	3
Other intermediate production & transport workers	90	7
Total intermediate production and transport workers	87	9
Elementary clerical, sales and service workers	87	11
Mining support workers & driller's assistants	78	18
Other labourers and workers	87	10
Total labourers	83	13
TOTAL ALL OCCUPATIONS	84	13

Note: A small percentage of the overseas-born workforce did not state their year of arrival.
Source: 2001 Census

Sources of migrants

The 2001 Census showed that most of the overseas-born managers in the mining industry were from the UK, North America, New Zealand and South and Other Africa - the mainly English-speaking countries - with a small proportion from Northeast Asia. For example, 37 per cent of overseas-born general managers were from the UK and Ireland, 14 per cent from New Zealand, 14 per cent from North America, 10 per cent from South and Other Africa and 8 per cent from Northeast Asia (China, Japan and Korea). Nearly half of all migrant production managers were born in UK or Ireland.

The UK, New Zealand, North America and South and Other Africa were also the main sources for overseas-born geologists and geophysicists (Table 10). Between 10 and 20 per cent of mining engineers and other building and engineering professionals were from Southeast and South Asia, as were accountants and computing professionals.

Table 10: Major source region or country of the mining industry's overseas-born workforce in selected occupations, 2001

Occupation	Number of people	% born in					
		NZ	UK, Ireland	Other Europe	North America	S & E Africa	Other (Asia*)
General managers	250	14	37	11	14	10	8 NE
Production managers	649	16	47	11	6	8	
Geologists & geophysicists	828	16	41	12	10	7	
Mining & materials engineers	495	10	38	12	12	6	7 SE , 5 S
Other building & engineering prof.	459	8	42	14	5	8	12 SE , 5 S 15 SE , 8 S, 5 NE
Accountants	383	8	31	9	5	11	13 SE , 5 S, 5 NE
Computing professionals	212	11	39	13	5	6	NE
Building & engineering assoc. prof.	707	28	44	13	1	3	
Metal fitters & machinists	914	25	44	17	1	4	
Drillers	457	50	32	9			
Miners	2,180	42	31	17	2	2	2 SE

* NE=North-east Asia, S=Southern Asia, SE=South-east Asia

Source: 2001 Census

Overseas-born persons working in the mining industry in trade occupations and as miners are mainly of English-speaking background. In 2001 the UK- or Ireland-born made up close to half of all overseas-born metal fitters and machinists and the New Zealand-born made up one-quarter. New Zealand was the largest overseas source of drillers and miners. Half of all the overseas-born drillers in the industry were from New Zealand, as were 42 per cent of the overseas-born miners. The UK and Ireland were the origins of one-third of the overseas-born workforce in these two occupations.

The mining industry workforce had a higher percentage of people with qualifications compared with the Australian workforce. While the percentage of workers with degree qualifications was about the same in the mining industry (17 per cent according to the 2001 Census) as in the total Australian workforce (19 per cent), the percentage of workers with technical and trades qualifications was higher in the mining industry (38 per cent) than in the total workforce (28 per cent).

Migrants working in the mining industry were more likely to have post-school qualifications than their Australia-born co-workers, particularly those who were managers. Nearly 60 per cent of overseas-born managers in the mining industry had degree qualifications compared with just 44 per cent of Australia-born managers. The difference between professionals was much smaller, 69 per cent of the overseas-born had degrees compared with 66 per cent of the Australia-born. The percentage with degrees was the same among Australia-born and overseas-born geologists and geophysicists and a slightly higher proportion of Australia-born mining engineers had degree qualifications than their overseas-born counterparts. There was also not much difference between Australia-born and overseas-born tradespersons in terms of their having qualifications (Table 11).

Table 11: The mining industry workforce by level of post-school qualification and birthplace

Occupation or type of mining	% of Australia-born with				% of overseas-born with			
	Degree	Other	None	Total	Degree	Other	None	Total
Total	15	39	46	100	26	34	40	100
Occupation								
Managers	44	28	28	100	58	22	20	100
Professionals	66	20	14	100	69	18	13	100
Associate professionals	12	48	39	100	20	46	34	100
Trades	2	76	22	100	4	72	25	100
Engineering managers	63	26	11	100	74	20	6	100
Geologists & geophysicists	93	2	5	100	93	1	5	100
Mining engineers	79	14	7	100	77	14	9	100
Type of mining								
Coal mining	8	49	43	100	17	39	44	100
Oil and gas extraction	27	39	34	100	37	36	27	100
Metal ore	18	36	46	100	25	35	40	100
Other mining	7	31	62	100	12	30	57	100
Services to mining	24	32	43	100	37	28	35	100
Mining undefined	16	36	48	100	28	32	41	100

Source: 2001 Census

The workforce in Oil and Gas Extraction and Services to Mining are more highly skilled than that in Coal Mining and Other Mining. In Oil and Gas Extraction and Services to Mining, 27 per cent of the Australia-born workforce and 37 per cent of the overseas-born workforce had degree qualifications. In Coal mining, only 8 per cent of the Australia-born workers and 17 per cent of the overseas-born workers had degree qualifications and over 40 per cent of both the Australia-born and overseas-born workforce had no qualifications.

This analysis of the characteristics of migrants in the mining industry workforce shows that migration has contributed more in the managerial and professional occupations than in the trades and lower skilled occupations, which has been dominated by Australia-born persons. The contribution of recent migration to the industry is also greater in the managerial and professional occupations than in the trades and lower skilled occupations. It is also notable that the sources of migrants in the mining industry are mainly other English-speaking countries, with the UK as the predominant source, and New Zealand, US and South Africa being other significant sources. However, small numbers of migrants from Southeast and South Asian countries are working in the industry as engineers, accountants and computing professionals.

What has happened to migration since 2001

The analysis has shown that migration was not a significant factor prior to 2001. However, this was an era, particularly in the late 1990s, when mining employment actually declined. A better test of the propensity of the industry to draw on migrants is the experience since 2001 when employment grew very rapidly.

Tables 12 and 13 provide the information to assess whether persons with skills related to the mining industry have migrated to Australia since 2001. Table 12 details the settler numbers (those who enter Australia with a permanent resident visa or come from New Zealand and indicate on arrival that they intend to settle in Australia permanently. Settlers include persons entering Australia under family and humanitarian visas as well as skilled and business migration visas and New Zealanders. Table 13 details the numbers of arrivals entering on a temporary-resident visa with a duration of one or more years. They include persons sponsored by employers as well as working holiday makers, students and New Zealanders who indicate that they are long-term visitors.

Table 12 may surprise. It indicates that there has been no increase in the number of settler arrivals since 2001 in the mining-specific occupations of geologists, mining engineers, drillers and miners. It also shows that the number of settlers with trade skills is relatively low and in the case of metal fitters and machinists has declined since the late 1990s. There are however, large and increasing numbers of engineering and other professionals arriving as settlers. Some of these may have skills relevant to the mining industry. The table confirms the point made above that migration has been of little relevance to the mining industry in semi-skilled and labouring occupations.

In the case of long-term arrivals, Table 13 indicates that temporary-entrants are more important than settlers as a source of skilled workers in the occupations of geologist and mining and material engineers. This is particularly the case with the geologists where the numbers are quite large relative to the output of Australian graduates (see Table 17 below) and the total employed geologist workforce (only 5,090 as of 2001, see Table 2). However, as with the settler group, very few trade or semi-skilled workers with skills relevant to the mining industry are entering Australia. There has been some increase in the numbers since 2001, but they are still small.

Table 12: Settler arrivals by occupation, Australia, 1997-98 to 2004-05

Occupation (ASCO and name)	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
1222 Production Managers	144	119	125	100	76	77	67	90
1999 Other Managers & Administrators	4,204	4,825	5,394	5,912	5,193	5,023	5,406	5,998
2112 Geologists and Geophysicists	128	130	179	106	62	80	58	90
2123 Cartographers & Surveyors	38	37	32	32	28	22	32	32
2127 Mining & Materials Engineers	19	55	90	69	57	49	54	59
2129 Other Building & Engineering Prof	1,865	2,104	2,509	3,306	2,412	2,587	3,322	3,867
2999 Other Professionals	10,864	11,948	14,255	18,780	17,030	17,694	22,129	23,173
3112 Science Technical Officers	85	75	82	63	38	33	38	40
3129 Building & Engineering Assoc Prof	455	565	634	697	413	387	440	540
3999 Other Assoc Prof	2,403	2,699	3,377	3,590	2,702	2,895	4,033	4,667
4112 Metal Fitters & Machinists	239	606	522	498	322	421	482	460
4986 Drillers	23	22	10	20	11	4	9	8
4999 Other Tradespersons	5,261	5,471	5,543	5,346	4,334	5,358	6,723	6,577
7111 Mobile Construction Plant Operators	18	10	6	4	2	4	5	5
7123 Engineering Prodn Systems Wkrs	29	12	21	11	6	8	5	7
7311 Truck Drivers	225	184	211	131	99	97	103	139
7911 Miners	12	22	20	37	15	4	10	14
7999 Other Intermed Prodn & Tspt Wkrs	1,125	1,421	1,266	1,422	916	793	935	1,111
8999 Clerical, Sales & Service	6,407	7,679	9,520	8,298	6,803	6,971	8,234	9,718
9911 Mine Supp Wkrs & Drillers Assts	5	4	1	4	0	1	0	0
9999 Other Labourers	1,382	1,293	1,452	1,456	737	712	886	1,054
Self employed	199	437	695	1,133	1,163	1,492	1,747	1,570
Total excluding those not in the labour force	35,130	39,718	45,944	51,015	42,419	44,712	54,718	59,219
Not in the labour force	42,197	44,425	46,328	56,351	46,481	49,202	56,872	64,205
Total	77,327	84,143	92,272	107,366	88,900	93,914	111,590	123,424

Source: DIMIA, Overseas Arrivals and Departures, unpublished

Table 13: Visitor (long-term temporary resident) arrivals by occupation, Australia, 1997-98 to 2004-05

Occupation (ASCO and name)	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
1222 Production Managers	265	273	299	233	226	184	199	167
1999 Managers & Administrators	8,785	11,209	12,388	13,296	12,139	10,867	10,646	10,018
2112 Geologists and Geophysicists	315	317	302	228	228	233	220	347
2123 Cartographers & Surveyors	12	20	11	19	13	6	11	4
2127 Mining & Materials Engineers	163	195	121	99	94	92	101	61
2129 Other Building & Engineering Prof	2,195	2,990	3,190	3,483	3,735	3,837	3,974	5,137
2999 Other Professionals	11,749	15,380	16,536	20,086	21,899	22,255	24,001	26,113
3112 Science Technical Officers	50	48	49	47	51	71	88	59
3129 Building & Engineering Assoc Prof	177	438	404	509	487	480	496	599
3999 Other Assoc Prof	2,871	4,114	4,582	4,834	5,328	4,896	4,815	5,521
4112 Metal Fitters & Machinists	118	199	151	119	109	104	127	174
4986 Drillers	31	26	33	14	10	20	21	23
4999 Other Tradespersons	2,057	2,750	2,751	2,934	3,185	3,319	3,701	3,976
7111 Mobile Construction Plant Operators	4	3	1	2	1	1	1	1
7123 Engineering Prodn Systems Wkrs	10	17	13	6	6	9	2	2
7311 Truck Drivers	152	116	105	69	67	59	62	85
7911 Miners	28	43	28	21	31	23	25	51
7999 Other Intermed Prodn & Tspt Wkrs	537	1,119	688	729	710	606	728	886
8999 Clerical, Sales & Service	6,252	8,040	9,546	11,040	13,662	13,213	11,418	13,285
9911 Mine Supp Wkrs & Drillers Assts	3	1	1	4	1	1	0	0
9999 Other Labourers	624	800	818	796	617	519	602	703
Self employed	177	432	609	911	1,115	1,093	860	621
Total excluding those not in the labour force	36,575	48,530	52,626	59,479	63,714	61,888	62,098	67,833
Not in the labour force	67,181	71,362	80,572	98,832	112,159	122,207	129,229	134,362
Total	103,756	119,892	133,198	158,311	175,873	184,095	191,327	202,195

Source: DIMIA, Overseas Arrivals and Departures, unpublished

The next question concerns what are the visa subclasses under which the settlers are arriving. Are they being recruited under the skilled categories and if so are employers active in sponsoring these migrants under the employer nomination category. Table 14 provides detail on the skilled visa categories for permanent residence under the general skilled migration program and employer-sponsored categories for geologists and geophysicists and mining and materials engineers over the period 2000-01 to 2004-05. As can be seen, there are a large number of visa categories. It is evident that the system is quite complex and challenging for any non-expert to understand because each visa type has specific terms and conditions. The characteristics of each of these visas and their potential for the mining industry are explored in detail below.

Table 14: Number of Geologists and Geophysicists and Mining and Materials Engineers Primary Applicants approved under the GSM Program by visa subclass, 2000-01 to 2004-05

Occupation and visa subclass	2000-01	2001-02	2002-03	2003-04	2004-05
2112 Geologists & Geophysicists					
<i>Under the General Skilled Migration Program</i>					
Independent visas					
126 Independent	17	4	2		1
136 Skilled - Independent	10	8	16	3	5
880 Skilled - Independent Overseas Student		2	1	1	2
Relative sponsored visas					
105 Skilled - Australian Linked	3	1	1		
138 Skilled - Australian Sponsored	2	4	4	3	10
881 Skilled - Australian Sponsored Overseas Student			1		1
State-Specific and Regionally Sponsored visas					
139 Skilled - Designated Area Sponsored		3	5	3	4
882 Skilled - Designated Area Overseas Student			2		
Total General Skilled Migration Program	32	22	32	10	23
<i>Other skilled involving employer sponsorship</i>					
119 Regional Sponsored Migration Scheme		1		1	2
121 Employer Nomination	5	2	4	1	1
124 Special Talents - Australian Support		1			
128 Business Skills - Senior Executive					1
805 On-Shore - Skilled Occupation	1				
855 On-Shore - Labour Agreement					2
856 On-Shore - Employer Nomination		1	5	6	5
857 On-Shore - Regional Sponsored Migration Scheme					3
Total	6	5	9	8	14
2127 Mining & Materials Engineers					
<i>Under the General Skilled Migration Program</i>					
Independent visas					
126 Independent	14	8	2		
136 Skilled - Independent	22	35	34	41	42
880 Skilled - Independent Overseas Student		2	3	12	13
Relative sponsored visas					
105 Skilled - Australian Linked	5	2			
138 Skilled - Australian Sponsored	1	1		2	
State-Specific and Regionally Sponsored visas					
137 Skills - State/Territory - Nominated Independent					1
882 Skilled - Designated Area Overseas Student			1		
495 Skilled - Independent Regional					2
Total General Skilled Migration	42	48	40	55	58
<i>Other skilled involving employer sponsorship</i>					
119 Regional Sponsored Migration Scheme					1
121 Employer Nomination	3	2			4
855 On-Shore - Labour Agreement				3	
856 On-Shore - Employer Nomination		2	1	1	19
857 On-Shore - Regional Sponsored Migration Scheme					3
858 Distinguished Talent					1
Total	3	4	1	4	28

Source: Department of Immigration and Multicultural and Indigenous Affairs, unpublished

The numbers of visas issued as primary applicants under the general skilled migration and employer sponsored visas for these two mining-specific professional occupations is small and shows little increase over the five years, despite the expansion of the immigration program during this time. The low level of visas issued to geologists under the general skilled migration program since 2002-03 in part reflects the difficulties persons wishing to nominate with a 50 point occupation under the GSM program have in achieving the pass mark required.

On the other hand, the table shows that former overseas students trained in mining engineering or geology are starting to take up the opportunities to apply for permanent residence under the skilled independent overseas student visa subclasses made available since mid-2001. There were 12 mining and material engineers visaed under subclass 880 in 2003-04 and 13 in 2004-05. In late 2005 mining engineers were added to the Migrant Occupations in Demand List (MODL) which means that anyone nominating this occupation will receive an additional 15 to 20 points and thus virtually be assured of selection.

The skill visa programs are not the only source of mining specific expertise. A comparison of the numbers of visa issued with the settler arrivals indicates that other sources must have been involved. In the case of the geologists Table 15 shows that the greatest source is persons coming as secondary applicants under the general skilled migration program (for example, accompanying wives or husbands with other skilled occupations). In addition, there are significant numbers entering under the family reunion program and as New Zealand citizens. An examination of the mining and materials engineers produced quite different results. Almost all these settlers entered under the skilled categories. It may be that one explanation for the difference is that mining and material engineers is a 60-point occupation so that anybody wishing to come to Australia with these skills could gain a permanent visa under the general skilled migration program.

Table 15: Visa classes under which settlers who are geologists and geophysicists and mining and material engineers enter in Australia, 2003-04 and 2004-05

	Geologists and Geophysicists		Mining and Materials Engineers	
	2003-04	2004-05	2003-04	2004-05
Skilled Program Primary Applicants	12	16	40	43
Skilled Program Secondary Applicants	15	31	4	5
Other Business/Skills	3	6	1	4
NZ	14	17	-	-
Family	13	19	8	7
Humanitarian	1	1	1	
Total settlers	58	90	54	59

Source: DIMIA, unpublished

Is there a brain drain? Overall skilled movements to and from Australia

In assessing the overall impact of migration, the settler movement has to be considered in the context of other movements in and out of Australia. These include the net flow of long-term visitors and residents moving in and out of Australia. There has been great concern expressed in recent years about an alleged 'brain drain', particularly of skilled Australian residents. As Table 16 shows there was a net loss of skilled Australian residents in 2004-05 in that the number of such residents (both Australia-born persons and overseas-born persons holding permanent resident visas) leaving Australia permanently or for a long-term visit (defined as one year or more) exceeded the number of Australian residents returning to Australia after a long term visit (defined as a year or more). Some net loss of Australian residents is inevitable in the contemporary world; especially of university-trained persons, given the interest such persons have always shown in seeing the world. Another factor in the case of the movement of those with mining skills is the growth in the services to mining industry sector in Australia noted earlier. Since a growing component of these services are exported this will involve the movement of Australian-based expertise overseas, usually on a temporary basis.

It is likely that these people will return to Australia. As has been shown elsewhere, this is also the case for most Australian residents with professional occupations.⁴

There is a net loss of Australian residents but, in aggregate terms, it is covered by the net gains of overseas-born persons coming to Australia for a long-term stay (many subsequently stay on in Australia) and by the flow of settlers into Australia. As Table 16 shows, the net overall gains are very large. For the skilled mining-specific occupations, however, the gains are modest. In 2004-05 there was a net gain of 234 geologists and 65 mining and materials engineers. For the lower skilled occupations of drillers and miners, migration has little impact on the overall stock of such persons in Australia.

Table 16: Movements of persons entering or leaving Australia permanently or long-term (12 months or more) by occupation by resident status, 2004-05*

Occupation	Arrivals				Departures			Net			
	Settlers	Resident s	Visitors	Total	Residents	Visitors	Total	Settlers	Residents	Visitors	Total
Production Managers	90	96	167	353	207	86	293	90	-111	81	60
Managers & Administrators	5,998	7,519	10,018	23,535	14,918	3,479	18,397	5,998	-7,399	6,539	5,138
Geologists and Geophysicists	90	200	347	637	333	70	403	90	-133	277	234
Cartographers & Surveyors	32	5	4	41	1	1	2	32	4	3	39
Mining & Materials Engineers	59	13	61	133	49	19	68	59	-36	42	65
Other Building & Engineering Prof	3,867	3,988	5,137	12,992	5,596	1,588	7,184	3,867	-1,608	3,549	5,808
Other Professionals	23,173	27,818	26,113	77,104	42,323	11,873	54,196	23,173	-14,505	14,240	22,908
Science Technical Officers	40	17	59	116	34	22	56	40	-17	37	60
Building & Engineering Assoc Prof	540	400	599	1,539	616	264	880	540	-216	335	659
Other Assoc Prof	4,667	6,506	5,521	16,694	9,555	3,765	13,320	4,667	-3,049	1,756	3,374
Metal Fitters & Machinists	460	221	174	855	323	126	449	460	-102	48	406
Drillers	8	18	23	49	35	13	48	8	-17	10	1
Other Tradespersons	6,577	4,781	3,976	15,334	6,332	3,311	9,643	6,577	-1,551	665	5,691
Mobile Constructn Plant Operators	5	0	1	6	1	0	1	5	-1	1	5
Engineering Prodn Systems Wkrs	7	1	2	10	0	0	0	7	1	2	10
Truck Drivers	139	80	85	304	143	96	239	139	-63	-11	65
Miners	14	30	51	95	98	29	127	14	-68	22	-32
Other Intermed Prodn & Tspt Wkrs	1,111	781	886	2,778	1,373	1,066	2,439	1,111	-592	-180	339
Clerical, Sales & Service	9,718	12,872	13,285	35,875	23,019	7,684	30,703	9,718	-10,147	5,601	5,172
Mine Supp Wkrs & Drillers Assts	0	0	0	0	0	1	1	0	0	-1	-1
Other Labourers	1,054	609	703	2,366	1,446	1,208	2,654	1,054	-837	-505	-288
Self employed	1,570	451	621	2,642	667	561	1,228	1,570	-216	60	1,414
Total	59,219	66,406	67,833	193,458	107,069	35,262	142,331	59,219	-40,663	32,571	51,127

* Note that table does not include persons not in the labour force.

Source: Department of Immigration and Multicultural and Indigenous Affairs, Overseas Arrivals and Departures, unpublished

Domestic training in the mining industry

The analysis of domestic training levels for mining-specific occupations was not part of the brief for this project. Nonetheless, in order to comment on the role that migration is playing or might have to play in the future it is necessary to provide some information on training levels whether for domestic students or overseas students. The focus below is on university level training. This in part because, as the preceding analysis has shown, migration is not likely to play a major role at the trade or semi-skilled end of the mining workforce.

There is unlikely to be any immediate expansion in the ranks of new graduates from the geology or mining engineering fields, or for that matter from other engineering and science fields, because the number of new undergraduate commencements, at least for Australian residents, has not increased over the past decade.⁵

Table 17 shows the number of course completions for domestic and overseas students completing bachelor and higher degrees in engineering and selected natural and physical sciences fields in 2001, 2002 and 2003. Completion data for 2004 will not be released by DEST until later this year. The table is consistent with the point made above that graduate numbers are unlikely to increase. In the case of domestic students graduate numbers for all engineering were 7,577 in 2001 and 7,475 in 2003. However, there is some movement upwards in the case of domestic mining students between 2001 and 2003.

The most striking aspect of the table is that it shows that the one area where engineering related training and thus graduate numbers are increasing is amongst overseas students studying in Australia. The number of such graduates in engineering increased from 2,313 in 2001 to 3,225 in 2003. Much of this increase is attributable to a sharp increase in the number of overseas students studying electrical and electronic engineering at the masters-by-coursework level between 2001 (232 completions) and 2003 (766 completions).⁶ It is possible that with the addition of mining, chemical and petroleum engineering to the MODL in late 2005 more overseas students will enrol these engineering specialities.

Table 17: Course completions for Bachelor and higher degrees, Engineering and Related Technologies and selected Natural and Physical Sciences by field and level, domestic and overseas students, 2001 to 2003

	Domestic			Overseas onshore		
	2001	2002	2003	2001	2002	2003
<i>Mining Engineering</i>						
Higher degree by research	9	11	27	2	1	8
Masters by Coursework	13	9	11	3	3	4
Other postgraduate	36	45	66	0	0	2
Bachelors	156	134	156	4	1	1
Total	214	199	260	9	5	15
<i>Other Process and Resources Engineering</i>						
Higher degree by research	122	128	100	38	25	34
Masters by Coursework	4	6	9	12	19	37
Other postgraduate	13	21	28	2	11	9
Bachelors	536	566	451	102	140	164
Total	675	721	588	154	195	244
<i>Mechanical and Industrial Engineering and Technology</i>						
Higher degree by research	64	83	88	23	20	14
Masters by Coursework	44	47	38	65	91	137
Other postgraduate	60	36	50	1	2	4
Bachelors	840	812	770	282	269	230
Total	1,008	978	946	371	382	385
<i>Civil Engineering</i>						
Higher degree by research	79	102	113	21	27	29
Masters by Coursework	180	168	179	208	182	225
Other postgraduate	31	14	19	2	4	5
Bachelors	904	809	811	191	150	156
Total	1,194	1,093	1,122	422	363	415
<i>All Other Engineering</i>						
Higher degree by research	197	205	242	69	64	63
Masters by Coursework	395	394	426	433	593	1,047
Other postgraduate	269	218	248	49	37	76
Bachelors	3,625	3,400	3,643	806	799	980
Total	4,486	4,217	4,559	1,357	1,493	2,166
<i>Total Engineering and Related Technologies</i>						
Higher degree by research	471	529	570	153	137	148
Masters by Coursework	636	624	663	721	888	1,450
Other postgraduate	409	334	411	54	54	96
Bachelors	6,061	5,721	5,831	1,385	1,359	1,531
Total	7,577	7,208	7,475	2,313	2,438	3,225
<i>All Earth Sciences</i>						
Higher degree by research	85	79	88	28	21	19
Masters by Coursework	19	26	22	8	6	9
Other postgraduate	25	15	19	4	3	6
Bachelors	348	273	274	5	9	11
Total	477	393	403	45	39	45
<i>All Chemical Sciences</i>						
Higher degree by research	199	179	172	25	27	30
Masters by Coursework	3	8	8	4	3	6
Other postgraduate	19	2	6	1	3	0
Bachelors	307	270	261	16	23	26
Total	528	459	447	46	56	62
<i>Physics</i>						
Higher degree by research	97	89	120	12	18	23
Masters by Coursework	2	0	2	1	5	0
Other postgraduate	0	20	2	0	0	2
Bachelors	103	99	167	3	1	3
Total	202	208	291	16	24	28

Includes bachelor degree completions where the supplementary field of education is an engineering field of study.

Source: DEST aggregated data sets

The increase in graduate numbers noted in Table 17 for mining engineers may not be sustained. The basis for this observation is shown in Table 18 which indicates the 'equivalent full-time student load' in mining engineering subjects undertaken at the undergraduate level by domestic students in the 2001 to 2004. It shows that there was an actual decline in student load of 15 per cent between 2001 and 2004. Although it is most likely that mining-specific professionals will undertake mining engineering as part of their engineering undergraduate degree, many such students will also study geology and materials engineering. In these two subject disciplines, there has been a pattern of growth, with enrolments in geology and materials engineering subjects increasing by 12 and 17 per cent, respectively.

Table 18: Domestic students enrolled in undergraduate engineering courses: Equivalent Full Time Student Load (EFTSL), 2001 - 2004

Subject group #	2001	2002	2003	2004	Change in EFTSL	
					EFTSL	%
Geology subjects	88	87	70	99	10	12
Mining Engineering subjects	290	267	253	248	-43	-15
Materials Engineering subjects	504	489	540	587	83	17

Identified in DEST files as 'Field of Education'

Source: DEST Aggregated Data 'ULAG' data sets, 2001-2004

The pattern of decline in the number of students studying mining is common to the rival nations of Canada and the USA. As noted in a comment on the situation in Canada under the heading 'Labor shortages clouds mining boom':

According to the Colorado School of Mines, there used to be 24 mining engineering programs across North America. Now there are 14. A decade ago, there were 300 to 400 students graduating from mining engineering schools. Today there are about 100.⁷

Immigration options

Permanent entry visas

Australia's migration system offers two broad points of entry into the Australian labour market. The first is via visa subclasses which offer permanent-entry status either directly or via two-stage visas which involve an initial temporary visa and thereafter a permanent visa if certain performance conditions are met. The second entry point is via temporary entry visas permitting the applicants to work in Australia for limited periods. These visas do not provide the privileges of permanent entry (such as access to Medicare).

Within the permanent-entry group the main visa categories designed to attract skilled migrants are grouped under the General Skilled Migration (GSM) rubric. The GSM group of visas accounts for about 75 per cent of all visas issued on the basis of skills. The GSM visas all involve some element of points testing. The largest is the Skilled –

Independent subclass (136) which allows persons overseas to apply for permanent residence without any need for sponsorship from relatives or from a State government or regional authority. This visa subclass has an onshore overseas student counterpart (category 880). This caters for overseas students, who have to apply within six months of completing their Australian training if they wish to be eligible. As a minimum, applicants need to have professional or trade credentials which are recognised in Australia, functional English (minimum of IELTS 5) and be under 45. The 880 visa involves concessional terms (relative to the 136 visa), in that an additional 5 points is allocated for Australian training (at the undergraduate or coursework Masters level) and the job experience required for 136 candidates is waived. The 880 category has grown very rapidly. By 2004-05 the number of visas issued to primary applicants under this visa reached the same level as under the 136 visa subclass. The passmark for both the 136 and 880 visas was raised from 110 to 115 points in May 2002. It was further raised to 120 for subclass 136 in May 2004 and in April 2005 the passmark for subclass 880 was raised to 120 to match that of subclass 136.

Demand for these visas has been high, especially onshore. As indicated, the Government has increased the passmark partly because of this growth in demand. The result is that the persons selected have to possess 60 point occupations to succeed in their application. Most vocationally specific occupations in the professions and the trades are 60 point occupations. This is true of engineers, but geologists are an exception. In effect, no associate professional occupations (including technicians) are now eligible under the GSM except for those sponsored under the regional visas.

These State Specific and Regional Migration (SSRM) visas are allocated on concessional terms relative to the 136 and 880 visas (in that the pass mark is lower). This group of visas require sponsorship by a State Government or a relative living in certain designated areas. Table 19 shows the numbers of Primary Applicants visaed under each of the GSM visa subclasses over the years 2000-01 to 2004-05.

Table 19: Primary Applicants visaed under the General Skilled Migration Program, 2000-01 to 2004-05

Visa subclass	2000-01	2001-02	2002-03	2003-04	2004-05
Independent visas					
126 Independent (replaced by subclass 136)	3,195	1,063	134	29	12
136 Skilled – Independent	8,016	10,498	13,540	12,276	11,826
880 Skilled - Independent Overseas Student		5,284	7,049	10,188	12,978
Relative sponsored visas					
105 Skilled - Australian Linked (replaced by subclass 138)	1,589	829	424	163	65
138 Skilled - Australian Sponsored	710	835	1,615	2,214	2,468
881 Skilled -Australian Sponsored Overseas Student		137	381	745	855
State-Specific and Regionally Sponsored visas					
106 Regional Linked (replaced by 139)	35	8	6	2	1
134 Skill Matching		4	9	51	72
137 Skills - State/Territory - Nominated Independent	13	84	255	539	905
139 Skilled - Designated Area Sponsored	384	592	1,550	2,579	2,247
882 Skilled - Designated Area Overseas Student		59	270	527	608
495 Skilled - Independent Regional					622
Total visaed under GSM	13,942	19,393	25,233	29,313	32,659

Source: Department of Immigration and Multicultural and Indigenous Affairs, unpublished

The SSRM visas have some potential to channel prospective migrants into non-metropolitan locations, including mining centres. This is because, unlike the Independent subclass 136 and its onshore overseas student counterpart visa, there are locational restrictions associated with certain SSRM visas.

In the case of the largest of this group of visas, the Designated Area Sponsored visa, these restrictions have no value from the point of view of regional employers, including the mining industry. This visa requires sponsorship by a relative living in certain designated areas of Australia. From 1 July 2006 it will become a two-stage visa requiring the sponsored migrant to live in the same area as their sponsor for a minimum period of two years before a permanent visa will be issued. Currently all parts of Australia except Sydney, Newcastle, Wollongong and Perth are designated areas. This means that relatives living in Melbourne can sponsor under this visa class and over the past few years the majority of these visas have been issued to migrants sponsored by relatives living in Melbourne.

The other two major SSRM visas have more potential as conduits for migrant skills related to the mining industry. The State and Territory Nominated Independent (STNI) visa which is the next largest category requires applicants to be sponsored by an approved state or territory government agency. Under this visa subclass, migrants are allocated a permanent entry visa. Only those with an occupation listed on the Skilled Occupation List (SOL) — which as explained below does include the Associate Professionals — and on the nominating state or territory's skilled shortage list are eligible. However, these lists exclude some key semi-skilled mining occupations from eligibility. Another problem from the mining industry's perspective is that the sponsored migrants can settle anywhere within the nominating state's borders. In practice the vast majority of those sponsored have settled in the state capitals of the two states that have been most active in utilising this visa subclass; that is Victoria and South Australia. The Western Australian Government began sponsoring migrants under the STNI provisions in August 2005. Its skilled shortage list includes all of the engineering professional and trade skills likely to be of interest to the mining industry, including mining engineering and also geologists and geophysicists. Though the overall numbers so far are small, they include a few geologists and geophysicists. At the time of writing, the Queensland Government is yet to begin utilising this visa subclass.

The only explicitly regional visa category under the GSM group of visas is the Skilled Independent Regional visa subclass (the SIR visa). Like the STNI visa, applicants must be sponsored by a state government and their nominated occupation must be on the SOL. But, unlike the STNI visa, the SIR visa is two-staged, starting with a temporary resident visa. If the temporary visa holder lives in a designated area for two years and is employed for 12 months in a designated area, he or she can then apply for a permanent entry visa. This is not automatically allocated. Eligible applicants have to apply under the STNI visa or be sponsored by a regional employer under the Regional Sponsored Migration Scheme (see below) or gain a business migration 'Business Owner' visa. The eligible locations exclude all metropolitan areas of mainland Australia except Adelaide. The Gold Coast, Newcastle, Wollongong and the NSW Central Coast are also excluded. This visa category came into operation from mid-2004. So far, the most active sponsor has been the South Australian Governments though the Victorian, NSW and WA governments all currently participate. The

participating sponsors specify the range of eligible occupations (again restricted to those on the SOL). Those sponsored tend to be Professionals (many computing professionals) or Tradespersons. However, the numbers are small and likely to remain so, because migrants who are not eligible to come to Australia under the much tighter criteria of the Skilled Independent (subclass 136) category are likely to choose the STNI rather than the SIR route. The former has similar concessional entry requirements but does not involve a two-stage visa process.

As is shown above in Table 14, very few migrants holding mining-specific professional occupations are utilising these SSRM categories.

The Skilled Occupation List (SOL)

The range of occupations eligible for selection under the GSM group is limited to occupations listed on a Skilled Occupation List (SOL). These occupations are grouped into 60, 50 and 40 point categories. Occupations not in the managerial, professional, associate professional and trade categories are not included on the SOL. As a result the SOL listing is a crucial determinant of migration outcomes under the GSM group of visas since if an occupation is not listed this precludes eligibility. Also the categorisation of SOL occupations is also very important in determining outcomes. As indicated, applicants nominating under an occupation listed in the 60 point group have a far higher chance of selection than those not so listed. In the case of the 880 visa, applicants have to nominate in a 60 point occupation in order to be eligible. The significance of the SOL ranking in migrant selections, especially for those applying as Independents, has become greater with the recent increase in the pass mark for the GSM visas.

In regard to the mining industry, mining engineers and geologists are listed on the SOL, the former in the 60 point category and the latter in the 50 point category. Several of the key mining specific occupations, however, are not listed on the SOL. These include drillers and miners, although drillers are on the list of eligible occupations that can be sponsored under the ENS. None of the main semi skilled occupations in the mining industry are listed on the SOL, including mobile plant operators and truck drivers.

Other permanent-entry visas

Employers can sponsor migrants to specific full-time jobs within the employer's business under the offshore and onshore Employment Nomination visa subclasses (121 and 856) or under the Regional Sponsored Migration Scheme (RSMS – visa subclasses 119 and 857). The Australian Government has recently decided to expand the size of the employment nomination category and to liberalise the conditions under which such nominations occur.

Mining employers can take advantage of these visa subclasses, though as a general rule, as with the SSRM subclasses, they are limited to occupations listed on the SOL (which excludes miners, plant operators or drivers). One exception is drillers who are not listed on the SOL. However, an examination of the records indicated that only one

driller was sponsored by an employer for permanent entry during the five years to 2004-05. This may change according to DIMA officers since there have been recent sponsorships for drillers, mainly from the Philippines.

The RSMS permanent residence visa does have some potential for employers to nominate persons with semi-skilled occupations. These may be sponsored under 'exceptional circumstances' which include a documented need for such skills in particular regional areas. However, apart from the general lack of interest in sponsoring permanent migrants, there is a requirement that the sponsored persons live and work in a regional area for two years. This precludes fly-in fly-out arrangements.

Table 14 details the extent of employer sponsoring under the permanent entry visa subclasses for geologist and geophysicists, and mining and materials engineers. As the table indicates, the numbers are small with the partial exception of the onshore Employment Nomination visa subclass as regards mining and material engineers. Employers have shown a strong preference for temporary-entry sponsorship, in part because there is no guarantee that a migrant sponsored under permanent entry provisions will stay with sponsoring employer. The permanent-entry provisions are of use where an employer wants to maintain the services of a temporary-entry visa holder who wishes to stay in Australia permanently.

Finally it is possible that some skilled workers will come to Australia with occupations relevant to the mining industry as accompanying family members (of primary applicants), as sponsored relatives – mainly spouses, or via the humanitarian program. This was noted in the case of geologist and mining engineers above (see Table 15).

Temporary-entry visas

Business Long Stay subclass 457

Given the cyclical nature of the mining industry, it is to be expected that employers would be predisposed to take on workers on temporary contracts. For those wishing to draw on non-residents, the Business Entry (Long Stay) visa category (457) serves this purpose. It allows employers to sponsor as many persons as they wish for up to four years (renewable) so long as they can guarantee a full-time job for the period. Occupations down to ASCO major group 4 (tradespersons) are eligible. There is no requirement that the sponsored migrant's professional or trade credentials be assessed and approved by the relevant accrediting authority in Australia (as is the case for those applying under the GSM permanent resident visas). Employers located in a regional or low population growth area can seek exemption from the ASCO 1 to 4 limitation. There is also no requirement that the sponsor attest that the vacancies in question cannot be filled by residents (as is the case in the USA and Canada for temporary work visas).

The persons sponsored have to be paid a minimum wage of \$39,100 per year (though regional employers only have to pay at or above the Australian award level for the occupation). A major advantage of the Business Entry (Long Stay) visa is that those taking up the sponsorship are expected to take up and remain in the job for which they

have been sponsored. If they leave the job their visa may be annulled. By comparison, if an employer sponsors a migrant under the permanent-entry employer sponsorship category, the migrant can leave the sponsor's enterprise. Although DIMIA does have some powers to cancel the permanent resident visa, it is less likely to occur than for temporary entry visas.

Though the rules governing the 457 visa are liberal (by international standards) employers do face various costs and obligations. There are costs involved in recruiting migrants, transporting them to Australia and potential obligations for the health of the migrant while in Australia (sponsored migrants are not eligible for Medicare). Despite these costs there has been a sharp increase in the level of employer sponsorship under the Business Entry (Long Stay) visa subclass. The number of primary applicants sponsored grew from 24,145 in 2003-04 to 30,714 in 2004-05. In recent months the number of those sponsored has jumped to 5,600 per month.⁸

According to unpublished information provided by DIMIA, the number of persons nominated under the 457 visa subclass whose employment was in the mining industry has escalated from 988 in 2003-04 to 1,738 in 2004-05. The number of sponsors involved in these nominations was 182 in 2003-04 and 295 in 2004-05. As anticipated, the scale of nomination under the temporary-entry employer sponsorship category dwarfs that under the permanent-entry employer-nomination visa subclasses detailed above.

Labour Agreement (subset of 457 visa subclass)

A Labour Agreement is a formal arrangement negotiated between the Australian Government (represented by the Department of Immigration and Multicultural Affairs and the Department of Employment and Workplace Relations [DEWR]) and an employer or an industry association. It allows the employer to recruit a specified number of workers from overseas in response to identified or emerging labour market (or skilled) shortages. The agreement is negotiated for a period of two to three years and employees may be sponsored for either temporary or permanent entry (see DIMIA's website: http://www.immi.gov.au/faq/migrate/migrate_employer/employer04.htm).

A distinctive feature of this visa is that it permits sponsorship for persons with skills down to ASCO level 7, including miners and mobile plant operators. The drawback from the point of mining employers is that a Labour Agreement requires a commitment on the part of the sponsoring employer or sponsoring association to specify a plan of training for local residents and an annual report indicating progress to this end. If this training is not provided the visa may not be renewed. DEWR is tasked to promote the training element.

There are currently some 100 Labour Agreements in place. Most are delivering migrants on a temporary basis. They enter under the 457 visa and thus are not usually identified in the published statistics. However, DIMIA officials estimate that several thousand would have entered under this visa in 2005.

There is interest in the mining industry in this visa. However, it may be that a more flexible alternative is required to meet the industry's needs in the present labour vacancy crisis. Such alternatives are explored in the recommendations section.

ANU Survey of 457 visa sponsors

In 2003-04, researchers at the ANU in collaboration with DIMIA conducted a survey of holders of the 457 visa (a report of the findings of the survey is found on DIMIA's website (<http://www.immi.gov.au/research/publications/index.htm>). Among the 1,175 people who responded to the survey were 40 people who worked in the mining industry. Although this is not a large number, it provides some information about the characteristics of the people sponsored by mining companies under the 457 visa subclass. The survey also collected information on the reasons for their coming to work in Australia and whether they intended to apply for permanent residence.

The 40 people working in the mining industry made up just 3 per cent of the total number of survey respondents. This percentage was consistent with DIMIA's unpublished statistics for 2001-03 showing that only 2 per cent of all the temporary entrants on the 457 visa were working in the mining industry. The mining industry workers in the survey were located mainly in Western Australia. Other residential locations were in Queensland and Victoria. Their employers included both small (less than 25 employees) and large (more than 300 employees) companies. Many said that their employers had sponsored other workers from overseas on the 457 subclass visa besides themselves.

The mining industry workers mostly came from the US, UK, other Western European countries and China. Other countries represented in the survey included Japan, Korea, India and Zimbabwe. Twenty-four occupations were represented among the 40 mining industry workers who were surveyed. They were mostly managerial and professional occupations, with only a few associate professional and trades occupations. The managerial occupations were General Managers and Specialist Managers that included Production Managers, Sales and Marketing Managers, Human Resource Managers, Information Technology Managers, Supply and Distribution Managers and Policy and Planning Managers. The main professional occupations were Geologists and Geophysicists, Civil Engineers, Mining and Materials Engineers, Building and Engineering Professionals and Accountants. Associate professional occupations included Project and Program Administrators, Building and Surveying Associate Professionals and Mechanical Engineering Associate Professionals. Trades occupations included Metal Fitters and Machinists. There was also a Safety Inspector. The general managers came from the US, Canada and China. Specialist managers were also likely to come from the US. The geologists and geophysicists came from the US, Japan and Italy and the engineers were from the US, Canada and India.

All the migrants had post-school qualifications: 40 per cent had post-graduate degrees, 40 per cent had Bachelor degrees and 20 per cent had technical or professional qualifications. These qualifications were obtained in the US, UK, Canada, China and France and the other countries of origin of the migrants. The areas of study included Engineering, Earth Science, Mining Engineering Science, Metallurgical Engineering Science, Chemical Engineering Science, Natural and Physical Sciences, Banking and Finance and Law. One had studied marine engineering science and another had studied occupational health and safety.

Many stated that they had been to Australia before their current period of residence as a 457 visa holder. Many had also extended their stay by renewing a previous 457 visa.

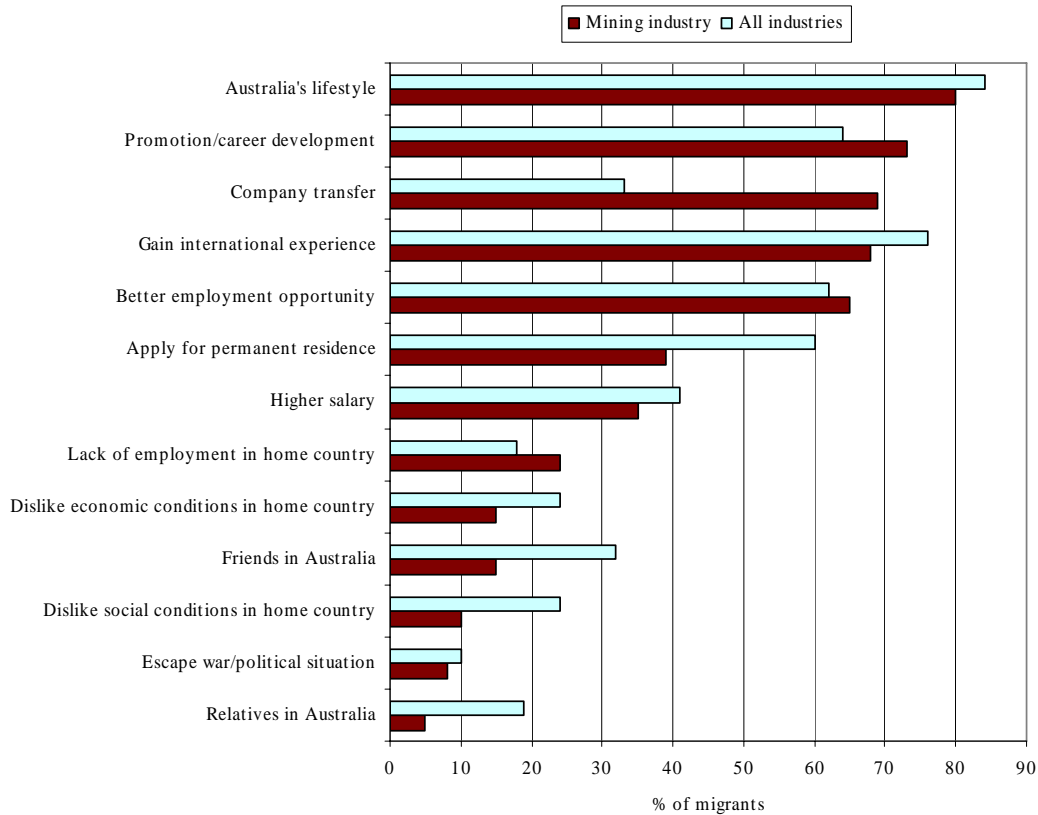
About half of the 40 people had worked in another country for three months or more before coming to work in Australia. This compares with 40 per cent of all the holders of the 457 visa in the survey, and suggests that the mining industry employees were more likely to have had overseas work experience than other migrants before coming to Australia. The countries they had worked in included those in Europe, Southeast Asia, Middle East and Africa. When asked to compare the country where they had worked previously with Australia as a place to work and to live, the majority said that it was not as good as Australia and the rest said it was about the same. This suggests that Australia is quite competitive with other countries in attracting people to come to work in the mining industry. The other migrants in the survey with overseas work experience also thought that Australia was better than the other countries where they had worked, both as a place to work and as a place to live.

Figure 1 compares the reasons for coming to work in Australia indicated by temporary migrants in the mining industry with those indicated by all holders of the 457 visa in the survey. While there was no difference between the mining industry workers and all the temporary visa holders in the survey in indicating the attraction of Australia's lifestyle in their coming to work here, the mining industry workers were much more likely to come on company transfer than other temporary migrants. Two out of three migrants in the mining industry nominated company transfer as one of the reasons for coming to work in Australia compared with one out of three migrants in the survey. They were less likely to come with the intention to apply for permanent residence compared with all migrants. They were also less likely to come because of the presence of friends or relatives in Australia.

The temporary migrants in the mining industry who came on company transfer were mostly from the US and Canada. For many of these people, their coming to work in Australia was either a promotion for them or part of their career development to gain international experience. The migrants who indicated that they had come with the intention to apply for permanent residence were more likely to be from the UK, other European countries and China.

Although the majority of the temporary migrants in the mining industry had not come with the intention to apply for permanent residence, more than one-third had already applied for permanent residence and another one-third indicated an intention to apply. This is slightly less than for all 457 visa holders in the survey. More than one-third (36 per cent) of all temporary entrants surveyed had applied and nearly half (48 per cent) said they intended to apply for permanent residence. When asked to nominate the reasons for their wanting to apply for permanent residence in Australia, 90 per cent said that they liked Australia's lifestyle and more than 60 per cent said that living in Australia would be good for their children. People from Asia and Africa were much more likely to want to apply for permanent residence than those from North America or Europe (see report by Khoo, McDonald and Hugo on DIMIA's website).

Figure 1. Reasons for coming to work in Australia: 457 visa holders in the mining industry compared with all 457 visa holders in the survey



Source: Survey of 457 visa holders

As part of their study on temporary skilled migration, the ANU researchers with DIMIA’s collaboration also conducted a small exploratory survey of employers that had sponsored employees from overseas on the 457 subclass visa. (The findings from this survey are also on DIMIA’s website.) Out of the 135 employers that responded to the survey only four were from the mining industry. While this number was too small to produce any useful information for this study, some of the findings based on all the employers in the survey may be of interest.

The survey showed that employers were generally quite positive about the 457 visa scheme, which has provided them with the flexibility to tap into the global pool of skilled labour relatively easily. Most employers were satisfied with the information and assistance they received from DIMIA about the sponsorship process. Employers also commented that the 457 visa compared favourably with other countries' temporary skilled migration programs in that it gave work rights to spouses and free access to schooling for children in most states (although not New South Wales). Most employers also indicated that they expect to sponsor more people on the temporary visa in the future.

Conclusions

Preamble

Our responses to the specific questions in the brief concerning the potential role of migration in resolving current skill shortages in the mining industry are shaped by the material detailed above as well as our judgments about the state of the contemporary Australian labour market. The latter is in an exceptionally buoyant state. Mining industry demands for additional workers across the skill spectrum has coincided with a boom in employment across the Australian economy. Between August 2001 and August 2005 there was an increase in the net number of employed persons of some 900,000. This included an unprecedented increase in employment in the construction industry from 666 thousand to 863 thousand. While there will be some drop in demand from the housing sector, the demand for infrastructure construction workers in the major metropolises means that there is not likely to be any short-term decline in the overall demand for construction workers. As a result competition for domestic workers is likely to continue to be tight. The mining industry may have to increase the premium it now pays to attract such workers. Alternatively it will have to pay more attention to training its workforce. Since this alternative will take time, the option of migration is likely to be considered more seriously than at any time in the past couple of decades.

Responses to questions in the brief

Issue 1: Is there a brain drain?

There is no net brain drain of skilled persons from Australia. Australia is experiencing a very substantial brain gain from overseas sources. Though some Australian residents are moving overseas much larger numbers of settlers and visitors from overseas are moving to Australia. This is true of mining-specific occupations as well. The legacy of this brain gain is manifested in the significant proportion of overseas-born persons at the managerial and professional level within the industry (see Table 8).

Australia's brain gain at the trade and semi-skilled levels is less than that at the professional and managerial levels. It is also the case that to the extent Australia is experiencing net inflows of tradespersons, only a small proportion of these migrant tradespersons are working in the mining industry.

Issue 2: Has the mining industry capitalised on skilled migration?

The mining industry is a significant employer of overseas-born professionals within mining-specific occupations. However, the proportion of migrants employed in the industry is lower than for the overall employed workforce in Australia. Also, there are relatively few migrants employed who possess generic skills relevant to the mining industry such as metal fitters and electricians. Few of the semi-skilled workers employed in mining have a migrant background.

This outcome is not surprising. Australia's migration program is structured around the goal of general skills augmentation. It is relatively untargeted as regards the priority it places on skills in short supply and only a small component of the program has any regionally-specific locational requirement. The record described above indicates that migrants are less likely to locate in regional areas than are Australia-born persons. As a consequence, only a small number of migrants are being attracted to regional areas and into the mining industry in particular.

As regards permanent resident visas, the employer nomination category offers the greatest promise of delivering skills in demand into the mining industry. However, even here the prospects are limited because employers, if they wish to sponsor migrants prefer to do so on temporary contracts.

Issue 3: How important is the long term business visa (457category) as a source of skilled workers in the mining industry?

Mining employers have shown an interest in sponsoring migrants on temporary contracts. Employers in the mining industry were sponsoring temporary skilled migrants on the 457 visa at three times more than their share of the total Australian workforce. The number of mining industry employers sponsoring and the number of employees being sponsored under the 457 visa program have been increasing rapidly in the last few years. However, most of those sponsored were at the managerial and professional level.

Sponsors normally cannot bring in semi-skilled workers under a 457 visa. Sponsors can bring in such workers under Labour Agreements. A substantial number of those visaed under the 457 visa subclass are entering under such agreements as there are no skills eligibility rules. Instead employers have to commit to a program of employment, education, training and career opportunities for Australians as part of the agreement. As noted below in the first recommendation, such requirements are not always suitable for the mineral industry situation, especially in the start-up phase, where much of the work involves limited duration one-off projects.

The Labour Agreement facility is appropriate where the jobs involved are of a continuing nature, such as mining-specific jobs (whether skilled or semi-skilled) needed during the production phase of the mine. For such jobs, it is appropriate that the Labour Agreement specify a commitment to the training of domestic workers who would be expected to take over the positions in the long-term.

Nonetheless the 457 visa does serve the purpose of bringing in highly skilled workers to serve in locations where domestic workers are unavailable or unwilling to locate. An example is the visa subclass 422 (which functions like the 457 visa but is limited to doctors). This visa subclass is being used effectively to provide medical services in 'areas of need' (mainly in regional Australia) by overseas-trained doctors sponsored by employers on a temporary basis. Several thousand visas are being issued annually for such doctors, with an increasing proportion issued to doctors who come from non-Western countries.

Issue 4: How likely is it that temporary entrants (on the 457 visa) will apply for permanent residence?

There will be competition for skilled migrants from other countries. Therefore skilled migration is not a long-term solution unless the minerals industry in Australia is competitive in attracting skilled migrants. Australia's lifestyle is an attraction to many migrants, particularly those from Europe and North America. Australia is also an attractive destination country for migrants from developing countries, particularly migrants with children, who think their children will have a better future here.

The ANU survey, discussed above, shows that the majority of 457 visa holders want to apply for permanent residency. However, there are differences by country of origin. Americans and Japanese are least likely to want to apply. South Africans and people from developing countries in Africa, Asia, Middle East and South America are the most likely to want to apply.

Issue 5: Where can the Australian minerals sector access the required skills?

As indicated above, the industry may have to move to new sources for its trade and semi-skilled workers. In the past, as Table 10 shows, the main overseas sources for the mining industry were the United Kingdom and New Zealand. This applies to both professionals and tradespersons. However, the industry has begun to draw on Asian sources for its professional workforce and, to a lesser extent, South Africa. There is likely to be increasing competition for mining industry workers from these countries, particularly from Canadian employers.

There are a variety of other possible source countries, including China. Mine shutdowns in North East China are creating rising unemployment and inefficient state enterprises have laid-off eight million workers. There will be emigration pressures as these workers will look for work in foreign countries.⁹ Increasing numbers of Chinese have been deployed as contract workers and labourers to a number of countries since the 1990s but more recent data are not available in relation to destination countries.¹⁰ Other possible locations include Eastern Europe. As detailed in the recommendations below, an important prospective source, particularly of semi-skilled workers, is Asians who have worked under contract in the Gulf States.

Issue 6: Are overseas students a potential source of professionals for the mining industry?

There has been an increase in overseas student enrolment in engineering fields in Australian universities over the past four to five years. In fact, the only growth in engineering training at Australian universities for the past decade has been amongst overseas students. There are no formal barriers to the expansion of full-fee overseas student enrolments at Australian universities. However, the cost of fees and tuition is a formidable constraint. Most of the overseas students interested in gaining permanent residence after completing their courses in Australia choose the least demanding and least costly course that would enable them to gain permanent residence. Engineering is not attractive from this perspective because it requires a four year investment at the

undergraduate level and is a demanding course. Most overseas students in engineering currently enroll in a Masters course of two years duration.

Former overseas students who complete engineering courses have shown a high propensity to seek permanent residence, in part because most of the growth in engineering enrolments has been amongst students from the subcontinent of India, the great majority of whom seek permanent residence after completing their courses. This is true regardless of the course in which they have enrolled (mostly accounting and computing). Such students have helped to increase the stock of young engineers, including in the mechanical and civil areas, though most of the enrolment growth has been in electronic engineering. Relatively few overseas students have enrolled in mining engineering. In the absence of some inducement like scholarships to help fund their tuition and living expenses, it is unlikely that overseas students will take up the mining engineering option. Offers of job placements for overseas students will not currently have much impact because of the limited enrolment levels of overseas students in mining engineering.

There is a case for a review of the arrangements governing the education of overseas students. Such students are taking up a major component of Australia's GSM visa program. There is a review currently occurring in which one of the authors (Birrell) is involved. This is considering ways to ensure that overseas students who seek permanent residence on completion of their courses possess the communication and professional or trade skills which Australian employers need. The recommendations will include an increase in minimum English standards and tougher assessment standards regarding the technical skills overseas students must possess if they are to gain permanent residence.

Issue 7: Training of domestic students

The best long term option for increasing the supply of skilled employees for the mining industry is for the mining industry to promote more industry relevant training in Australia's universities. Without some intervention it is unlikely that any substantial increase in university training in mining engineering, geology and other mining specific fields will occur. This is because the number of government subsidised places has barely increased in the decade since 1996. In this context, for universities to increase mining-related training implies transferring places from some other field. This is little incentive to do this. In these circumstances, what is required is the establishment of partnerships between the mining industry, or individual employers, and Australian universities to ensure that new places are created (and not just transferred from one faculty or another or, in the case of engineering, from one engineering discipline to another). Additional finance will be required either from the industry or State and Federal governments, or both.

Similar such arrangements could be made with the newly established technical colleges (for training in the trades), with summer internships and job placements with mining companies. The industry needs to assess its long-term (over the next 5-10 years) labour and skills needs and plan for them by investing more in training programs now.

Policy recommendations

Creation of a new temporary resident regional visa category

The severe skills shortage in the mining industry requires a rapid and flexible immigration response. For reasons explored in the body of this report, the existing visa categories do not fully meet industry's needs. This is partly because DIMA develops visa policy to address a national situation. As a result there has been a reluctance to allow persons in semi-skilled occupations to enter under the permanent and temporary entry visa categories, for fear that by doing so the opportunity will be exploited by employers located in metropolitan areas. In such settings it is hard to justify the importation of semi-skilled workers because domestic workers are potentially available who could be trained for the jobs in question. Also the metropolitan trade unions are very sensitive to any importation of such workers, especially if drawn from non-English-Speaking-Background countries. The fear is that the migrant workers are vulnerable to exploitation and that their employment conditions may erode those of local workers.

These concerns are justified. However, they are unlikely to apply to the current situation in the mining industry. Mining employers are in a strong financial situation to pay good wages. However, in the present tight labour market they cannot get the labour they need even under these conditions. There is a need for a visa category which caters to temporary labour supply crisis situations. This is particularly the case in the start-up phase of new mines and the provision of the associated infrastructure. The tendency in the industry is for mining enterprises to subcontract such construction work to task-specific companies. Companies with international links and/or experience in similar construction work overseas are in a good position to obtain this work. They can identify relevant semi-skilled construction and mine workers who have the required skills and experience. There is a reservoir of literally millions of persons from the South Asian countries of India, Bangladesh, Sri Lanka and Pakistan, and also from the Philippines, who have worked in the Gulf States and other wealthier Asian countries who could be drawn on.

The existing DIMA visas are not suitable for one-off temporary project work involving skilled and semi-skilled workers drawn from overseas. The proposed visa subclass would allow employers to sponsor ASCO 4 to 7 persons on a group basis for contract-specific tasks of up to two years to regional areas. Pay rates would have to be consistent with those prevailing for the skills in question and all relevant health and safety provisions would apply. Sponsors would have to be approved under rigorous guidelines concerning their bone fides and financial capacity to manage sponsored migrants. The sponsor would have to establish that there are severe shortages of domestic workers available for such work. But unlike Labour Agreements there would be no local training requirements, nor any requirement for DEWR or trade union involvement in decisions concerning the allocation of the visa. A condition of the visa would be that the workers in question would be on temporary contracts with the sponsoring firm. They would be required to leave Australia on the completion of the task and there would be no rights to permanent entry from within Australia.

Reclassify geologists and metallurgists as 60-point occupations on the SOL

Under the existing migration rules, a 60-point occupation is defined as one where a highly skilled area of vocationally specific knowledge is the key determinant of employment in the occupation. This is the case with the professions of geology and metallurgy. There is therefore a convincing case that these occupations should be reclassified from their current 50-point status to 60-point occupation. With the passmark for the GSM set at 120, very few persons who nominate 50-point occupations can gain selection under the offshore Skilled Independent visa subclass (136). Also, 50-point occupations are not eligible for the onshore overseas student Skilled Independent visa category (880) unless they have an Australian PhD.

Competency-based selection criteria for tradespersons

Currently the credential assessment authority for tradespersons (Trades Recognition Australia – TRA) assesses applicants who need skill recognition on the basis of paper records of their training and work experience. This policy is becoming increasingly problematic as the need to attract tradespersons from non-traditional source countries becomes evident. With the exception of the British influenced trade-training regimes in the Indian subcontinent, elsewhere in Asia people enter the trades along pathways which are difficult to assess via documentary evidence. There is no guarantee that persons assessed on the basis of paper credentials in fact possess trades skills equivalent to Australian standards. Fraud is rife in this field.

It is proposed that a return to competency assessments in trade fields, particularly in new source countries, should be placed on the skills planning agenda. There is a precedent for this. In the aftermath of the passage of the Tradesmen’s Rights Regulation Act of 1946, thousands of Australian-residents and migrants who possessed skills in the metal and electrical trades were examined and accredited by trade assessors on the basis of competency tests. Once a candidate passed these tests, they were recognised by employers and unions alike as possessing the skills needed for a ticket to work in these areas.

If this proposal was pursued it would require Australian trade assessors to visit prospective source countries and conduct the relevant competency tests. These could be across a wide spectrum of trade skills. There would have to be associated examinations on candidates’ knowledge of Australian workplace and industry practices, as well as relevant health and safety regulations. In most trades candidates would have to possess ‘vocational’ English (5 on the IELTS bands). It is envisaged that Australian trade assessors would periodically visit likely overseas sites to conduct these competency tests. This proposal could be considered in the context of the recent Council of Australian Governments (COAG) recommendations regarding recognition of overseas qualifications for tradespersons. These COAG proposals indicate the need for a single pre-migration offshore assessment process to meet skilled migration and licensing purposes.¹¹

Appendix I

Appendix 1: Persons employed in the mining industry by main occupation, 1996 and 2001

Main Occupations	Census 1996							Census 2001						
	110 Coal Mining	120 Oil & Gas Extracti on	130 Metal Ore Mining	140 Other Mining	150 Services to Mining	B000 Mining, undef	Total Persons	110 Coal Mining	120 Oil & Gas Extracti on	130 Metal Ore Mining	140 Other Mining	150 Services to Mining	Mining, undef	Total
1112 General Managers	54	22	118	78	264	120	656	83	36	218	57	210	72	676
1222 Production Managers	603	131	1,102	694	413	175	3,118	504	138	1,192	542	264	98	2,738
Other Managers & Administrators	333	229	534	366	835	335	2,632	459	330	1,013	226	735	234	2,997
Total Managers & Administrators	990	382	1,754	1,138	1,512	630	6,406	1,046	504	2,423	825	1,209	404	6,411
2112 Geologists & Geophysicists	82	93	990	51	1,439	154	2,809	81	157	1,138	52	931	64	2,423
2123 Cartographers & Surveyors	178	6	344	10	131	39	708	121	17	306	6	74	22	546
2127 Mining & Materials Engineers	339	68	454	21	285	95	1,262	363	223	632	23	274	53	1,568
Other Building & Engineering Professionals	474	163	495	69	289	168	1,658	321	305	539	31	287	66	1,549
2211 Accountants	164	85	323	67	312	167	1,118	224	191	512	64	242	114	1,347
2231 Computing Professionals	69	78	237	28	154	91	657	75	86	265	35	159	69	689
2291 Human Resource Professionals	144	46	363	29	82	63	727	105	58	354	41	98	52	708
Other Professionals	291	211	982	155	528	281	2,448	274	387	1,341	121	393	181	2,697
Total Professionals	1,741	750	4,188	430	3,220	1,058	11,387	1,564	1,424	5,087	373	2,458	621	11,527
3112 Science Technical Officers	93	71	466	77	254	68	1,029	84	38	285	27	103	21	558
3129 Other Building & Eng Assoc Professionals	1,264	20	1,140	78	282	163	2,947	1,175	73	1,826	122	213	109	3,518
Other Building & Engineering Associate Professionals	141	98	350	67	245	140	1,041	79	140	337	43	154	25	778
3292 Project & Program Administrators	81	53	202	47	185	67	635	117	132	351	65	154	60	879
Other Associate Professionals	390	134	578	219	558	203	2,082	361	227	694	180	417	147	2,026
Total Associate Professionals	1,969	376	2,736	488	1,524	641	7,734	1,816	610	3,493	437	1,041	362	7,759
4000 Tradespersons & Related Wkrs nfd	169	58	359	45	99	34	764	133	23	330	31	71	20	608
4112 Metal Fitters & Machinists	3,232	180	2,346	467	808	526	7,559	2,184	187	2,356	386	548	310	5,971
4122 Structl Steel & Welding Trades	460	24	520	194	237	158	1,593	254	23	411	152	144	108	1,092
4311 Electricians	1,781	63	1,150	87	188	189	3,458	1,205	68	1,021	99	114	102	2,609
4986 Drillers	389	124	733	180	1,335	199	2,960	144	231	714	169	845	172	2,275
Other Tradespersons	456	510	765	328	525	155	2,739	337	747	804	235	412	85	2,620
Total Tradespersons	6,487	959	5,873	1,301	3,192	1,261	19,073	4,257	1,279	5,636	1,072	2,134	797	15,175

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Appendix 1: Persons employed in the mining industry by main occupation, 1996 and 2001 (continued)

Main Occupations	Census 1996							Census 2001						
	110 Coal Mining	120 & Gas Extracti on	130 Metal Ore Mining	140 Other Mining	150 Services to Mining	B000 Mining, undef	Total Persons	110 Coal Mining	120 & Gas Extracti on	130 Metal Ore Mining	140 Other Mining	150 Services to Mining	Mining, undef	Total
5111 Secretaries & Personal Assistants	192	122	425	223	719	351	2,032	148	193	496	145	389	147	1,518
6111 General Clerks	196	62	279	209	262	115	1,123	142	70	247	117	128	80	784
6153 Stock & Purchasing Clerks	326	64	364	56	140	78	1,028	156	70	334	58	88	59	765
Other Advanced & Intermediate Sales, Service, Clerical Workers	349	128	708	403	677	325	2,590	342	239	881	316	518	178	2,474
Total Advanced & Intermediate Sales, Service, Clerical Workers	1,063	376	1,776	891	1,798	869	6,773	788	572	1,958	636	1,123	464	5,541
7000 Int Prodn & Transport Wkrs nfd	280	6	204	125	47	44	706	147	12	178	63	28	25	453
7100 Intermediate Plant Operators nfd	344	7	363	298	110	85	1,207	57	15	117	204	21	12	426
7111 Mobile Construction Plant Ops	686	4	611	928	243	156	2,628	453	12	552	677	122	63	1,879
7123 Engineering Prodn Systems Wkrs	442	11	942	295	75	70	1,835	288	9	1,085	213	33	33	1,661
7200 Intermed Machine Operators nfd	1,643	55	916	455	238	187	3,494	118	11	411	178	39	47	804
7311 Truck Drivers	600	11	627	1,038	274	206	2,756	495	12	774	641	151	101	2,174
7911 Miners	6,894	15	3,099	757	770	892	12,427	6,889	69	5,329	883	623	524	14,317
7993 Storepersons	131	27	237	24	75	60	554	118	43	260	26	73	44	564
Other Intermediate Production & Transport Workers	424	136	1,064	602	400	186	2,812	362	244	1,114	407	283	112	2,522
Total Intermediate Production & Transport Workers	11,444	272	8,063	4,522	2,232	1,886	28,419	8,927	427	9,820	3,292	1,373	961	24,800
Total Elementary Sales, Service & Clerical Workers	73	29	163	93	123	58	539	65	67	171	96	61	33	493
9911 Mine Sup Wkrs & Drillers Assists	177	33	793	184	693	139	2,019	119	90	524	163	354	125	1,375
Other Labourers & Related Workers	277	73	1,002	345	526	207	2,430	178	81	700	215	290	103	1,567
Total Labourers & Related Workers	454	106	1,795	529	1,219	346	4,449	297	171	1,224	378	644	228	2,942
0998 Inadequately described	190	60	409	165	165	110	1,099	116	57	219	60	72	52	576
Not stated occupation	70	8	81	58	43	54	314	32	7	45	12	21	21	138
Other	260	68	490	223	208	164	1,413	148	64	264	72	93	73	714
TOTAL	24,481	3,318	26,838	9,615	15,028	6,913	86,193	18,908	5,118	30,076	7,181	10,136	3,943	75,362

nfd=not fully described

Source: Australian Bureau of Statistics, Censuses of Population and Housing, 1996 and 2001, customised matrices

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