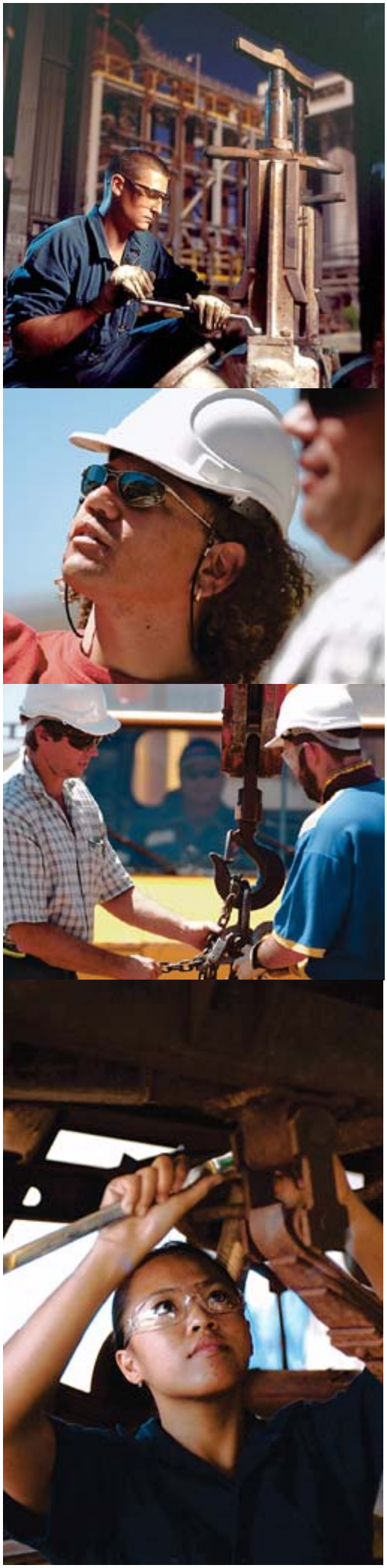

Emerging Industries on the Burrup: Skill Needs and Strategies

Report of the

Burrup Skills Taskforce

to the

Government of

Western Australia

Norm Marlborough, MLA
(Chair)

March 2003

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To the Government of Western Australia

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Overview

With the expansion of the Northwest Shelf Joint Venture liquefied natural gas (LNG) plant and several downstream gas processing projects imminent on the Burrup Peninsula, there is the opportunity to establish Western Australia as an international centre for the oil, gas and petrochemical industries, supported by a highly skilled, internationally competitive workforce and world-class training facilities.

To strategically position the State to take full advantage of this opportunity, the State Government established the Burrup Skills Taskforce in August 2002. The Taskforce was charged with the responsibility of preparing an integrated strategy to address the skill requirements arising from the planned projects, with an emphasis on optimising training and job opportunities for Western Australians.

The strategies identified by the Burrup Skills Taskforce will provide important input to the work of the State Government's seven-member Burrup Ministerial Group that has been established to expedite the planned Burrup developments for the maximum benefit of industry, the local community and the State.

The Taskforce was chaired by Mr Norm Marlborough MLA, Parliamentary Secretary to the then Minister for Training, the Hon John Kobelke MLA. The Taskforce comprised key industry representatives and stakeholders with expertise in the construction and/or operations skill requirements of existing and planned developments on the Burrup. The Taskforce deliberations centred on the following six projects which are committed or planned to proceed in the next 1-3 years:

- Woodside LNG expansion (Trains 4 and 5);
- Burrup Fertilisers ammonia plant;
- Methanex methanol plant;
- Dampier Nitrogen ammonia/urea plant;
- GTL Resources methanol plant; and
- Japan dimethyl-ether plant.

The Taskforce convened on several occasions during August – December 2002 to clarify the skill/occupational needs of the Burrup projects and to identify appropriate skill supply strategies. Members of the Taskforce undertook consultations with training providers, industry and local representatives in Karratha and Roebourne. Further discussions were held in the Perth metropolitan area with representatives from key industry associations and the Taskforce also visited training facilities relevant to the oil, gas and chemical processing industries.

6,000 Construction Jobs and 600 Operations Jobs on the Burrup

Based on workforce estimates provided by Burrup Skills Taskforce representatives and Worley Pty Ltd[1] the six major committed/planned LNG and gas processing projects on the Burrup will generate a peak **construction workforce** of almost **6,000 personnel** during 2005. Skill demand is expected to be particularly high for:

- metals/engineering tradespersons;
- electrical/electronic/instrumentation tradespersons;
- experienced process engineers;
- draftspersons and instrument/electrical designers;
- mobile plant and crane operators;
- quality assurance, quality control inspectors, quantity surveyors; and
- trades/technical supervisors.

When operational, the six projects have the potential to create more than **600 direct jobs** and **1,700 indirect jobs** across a range of other industries. The gas processing projects represent a new value-adding industry for Western Australia, with specialised skill and training requirements. This includes an estimated requirement for 230 control room/process plant operators. The following table identifies the predicted peak demand on the Burrup by occupation and relevant skill supply and training strategies.

[1] Worley Pty Ltd was commissioned by the Department of Education and Training to provide regular updates on the skill requirements associated with major planned Western Australian resource development and infrastructure projects.

Priority Occupations/Skills	Peak Burrup Demand		Non-training Skill Supply Strategies	Recommended Training Strategies
	Number	When		
Metal Trades				
Boilermakers & Mechanical Fitters	**430-450** **190-220**	2004/2005 2004/2005	Some short-term interstate migration or overseas immigration. The Burrup projects have received considerable national and international exposure. It is likely that qualified/skilled people from within and outside of Australia will seek work on the Burrup.	(1) Some supply from the 2,155 metals apprentices currently in training. (2) Refresher programs for former metal tradespersons. (3) Accelerated metals/engineering trade training.
Pipe Welders Plate Welders	**320** **340**	2004/2005 2004/2005		Upskill existing metal tradespersons in project specific pipe/plate welding codes and processes.
Pipe Fitters	**270-310**	2004/2005		Upskill existing metal tradespersons in piping fabrication and interpretation of pipe drawings.
Non-destructive Testing	**N/A**	2004/2005		Upskill existing metal tradespersons - units of competency from the Metals Training Package.
Cryogenic Insulation/Cladding	**60**	2004/2005		Upskill existing insulators/cladders - accredited course needs to be developed.
Electrical/Instrumentation Trades				
Electrical/Electronic Tradespersons (With instrumentation skills)	**240**	2005	This specialisation is persistently reported to be in shortage. As demand peaks, some interstate and overseas recruitment may occur.	(1) Some supply from existing electrical/instrumentation apprentices (1,534) (2) Refresher programs for former electrical/electronic instrumentation tradespersons. (3) Upskill existing (A Grade) electrical/electronic tradespersons in instrumentation.
Draftspersons/designers				
Knowledge of specialist design and drafting software packages	**290**	2003/2004	Some design/drafting will occur overseas. Most of the projects are based on plants overseas.	Upskill existing designers/draftspersons in specialist software packages.
Management				
Supervisors/Forepersons	**150-170**	2004/2005	The planned petrochemical projects are specialised and new to WA. Initially, some key project management personnel are likely to be sourced from the projects' parent overseas companies.	Upskilling for existing employees in frontline management qualifications or Statement of Attainment based on units of competency from the Business Services or Transport and Distribution Training Packages covering contracting, procurement, project management and logistics management.
Procurement/Expediter	**105-130**	2004/2005		
Management (Project)	**160**	2004		
Planner/Scheduler	**80-85**	2004/2005		
QA/QC/QS Inspector	**105-110**	2004/2005		
Semi-skilled Personnel				
Mobile Plant/Crane Operators	**150 - 170**	2004/2005	Some inflow from interstate.	Upskilling programs for existing workers in mobile plant/crane operations, rigging, dogging and scaffolding.
Riggers/doggers	**190 - 220**	2004/2005		
Scaffolders	**200**	2004/2005		
Opportunities for Local Indigenous People				
Trades (Metals, Electrical, Construction), Industrial Skills, Mobile Plant Operations	**N/A**	Ongoing	N/A	(1) Traineeships and apprenticeships with mentoring and support. (2) General construction and industrial skills programs. (3) Driver training programs.
Small Business Management	**N/A**	Ongoing	N/A	Training programs for Indigenous enterprises seeking to supply goods/services on the Burrup
Process Plant Operators				
Control Room/Process/Field Operators	**200** ***(est. 100 requiring some training)***	2007	Companies intend to recruit a combination of experienced, intermediate and entry level operators.	The Australian Petroleum Production and Exploration Association has identified a world wide shortage of process/control room operators. Relevant skilling strategies include the use of the Chemical, Hydrocarbons and Oil Refining Training Package to develop: (1) A suite of generic competencies Cert I + Cert II levels for entry-level employees. (2) Cert III + Cert IV competencies for intermediate level employees.
Processing Supervisors	**30**	2007	Substantial petrochemical related experience required. Initially, supervisors are likely to be sourced from overseas parent companies.	Workplace training and assessment programs to enable supervisors to assist with on-the-job training of control room operators.

Key Conclusions and Recommendations

The planned developments on the Burrup Peninsula represent a major challenge and opportunity for Western Australia.

Construction Training Needs

- Collectively, the six major committed and planned projects on the Burrup, are expected to generate a peak construction workforce of **6,000 persons** in 2005, contributing to a predicted State wide requirement for **8,000 construction personnel** during 2004 – 2005 (Worley, 2002).

- Western Australia has previously demonstrated its capacity to respond to construction workforce requirements of this magnitude. This was evident in 1997/98 when new resource development projects in the State collectively generated a peak construction workforce of more than **9,000 persons**.

- The State was able to accommodate this demand through a **combination of skill supply strategies**, including rapid-response skills development and training, short-term interstate migration and temporary business entry visas. The same strategies will need to apply this time.

The State Government has indicated its commitment to maximise job opportunities for Western Australians.

- The State Government, through the Department of Education and Training, invests approximately **$60 million** annually in publicly funded training programs relevant to the resources sector, representing more than **30,000 training** places. Of this amount, approximately **$31 million** is allocated to programs corresponding with the specific skill priorities identified by the Burrup Skills Taskforce.

The Burrup construction training needs can be met within the existing State Government training budget by refocusing delivery on upskilling programs and rapid-response industry training solutions. These programs can be delivered by the present mix of public and private training providers.

- Skilled people throughout Western Australia, from interstate and overseas are likely to be attracted to work on the Burrup. Ultimately, this could lead to **skill shortages in the metropolitan region and other areas**, rather than on the Burrup.

- **Preventative strategies** could include a **publicity campaign** promoting employment opportunities within the State's resources sector and the extensive range of relevant training programs currently available. Other strategies include **accelerated training**, **upskilling programs** for existing workers and **targeted training** in priority skill areas.

The Taskforce recommends the targeting and implementation of strategies to prevent or minimise skill shortages within a whole-of-State context.

- A range of industry and Government initiatives are currently operating on and near the Burrup to increase **training** and **employment opportunities** for the **Indigenous** community.

- However, a major factor restricting the employment of local Indigenous people is the **lack of a driver's licence**. This is exacerbated by the fact that many have acquired significant fines for driving violations.

The Taskforce recommends that Government address the Indigenous driving and employment issue through a moratorium to remove outstanding driving fines or a scheme enabling Indigenous people to acquire a driver's licence, gain employment and progressively pay their fines. An appropriately funded driver training scheme is urgently required.

Karratha TAFE

The Taskforce recommends that Karratha TAFE be positioned as a 'shop window' for a coordinated effort across the TAFE system to provide high quality, flexible and industry responsive training to support the developments on the Burrup. This could include:

- **Flying in lecturers with the most relevant expertise** on a needs basis and the establishment of a **Karratha TAFE Business Manager** to liaise with industry and coordinate the most relevant training.

- **Up-grading the skills of lecturers.** This could involve **professional development programs** to build the College's capacity to **customise training** to specific enterprise/industry needs, including **workplace-based training delivery**. In addition, the currency of lecturers' industry knowledge needs to be maintained. This could be achieved through **return to industry programs** and **industry placements**.

- **Co-locating Year 10, 11 and 12 students at the Karratha TAFE campus** as a means of aligning education and training pathways to local industry needs. This could also be a strategy to **reduce future skill shortages** by encouraging young people to enter industries with significant employment prospects, such as the oil and gas sector, which is experiencing shortages due to an ageing workforce.

The Department of Education and Training has developed an Action Plan to address the Burrup skill priorities and build the capability of Karratha TAFE and the vocational education and training (VET) system.

- Consultations undertaken in Karratha and Roebourne revealed that during peak periods of activity, some enterprises do not **release their apprentices/trainees** for the formal component of their training at TAFE. Twelve hour work shifts was also identified as a constraint to attendance at TAFE.

There is an onus on industry to support the training of apprentices/trainees not only by providing on-the-job training, but also by collaborating with the relevant training organisation to ensure that formal training requirements are met.

Processing/Operations Training Needs

- The six new projects on the Burrup will collectively create a **permanent operations workforce** of more than **600 personnel by 2007**.

The most significant skill demand will occur for control room/process operators and supervisors, with in excess of 200 required.

- These positions are **highly skilled and specialised**, with individuals requiring several years experience to become fully competent. Other Australian and offshore projects are expected to contribute to demand.

- Initially, some control room/processing operators will need to be obtained from outside the State. However, project representatives have confirmed their intention to **progressively train Western Australians**.

- **Training is vital within the oil, gas and petrochemical industries**, as demonstrated by the 1998 explosion and fire at a gas processing plant in Longford, Victoria. The accident resulted in two fatalities and eight serious injuries. Victoria was left without gas for two weeks, at an estimated cost of $1.4 billion to businesses and the economy. A Royal Commission attributed the accident to a failure to train workers adequately in safety procedures.

The Taskforce recommends the widespread industry adoption of the Chemicals, Hydrocarbons and Oil Refining Training Package to ensure a consistently high standard of training. This Package has been developed with the direct involvement and support of the Australian Petroleum Production and Exploration Association (APPEA).

- Currently the Australian Oil and Gas Industry Training Centre in Subiaco can deliver components of the Chemical, Hydrocarbons and Oil Refining Training Package up to Australian Qualifications Framework (AQF) level II and some AQF level III units of competency.

Another training delivery site located within an industrial area is required for the more advanced levels of the Training Package, which include gas testing.

- The Burrup gas processing projects offer new job and skilling opportunities for Western Australians. To maximise the benefits to the State, including the development of a highly skilled and internationally competitive workforce, the Government needs to commit to creating industry partnerships in the provision of relevant training and infrastructure.

A Strategic Opportunity for Western Australia

- In an address presented at the Offshore Europe 2001 Oil and Gas Conference in Aberdeen, **Premier Geoff Gallop** promoted Western Australia as:

  'A potential regional headquarters servicing oil and gas opportunities in Australia and the Asia-Pacific region'.

- Western Australia supplies about **55%** of Australia's total oil and condensate and **100%** of its LNG. The State is the **third largest producer of LNG in the world**.

- The industry's ability to compete in the global arena was evidenced recently with the successful negotiation of the **$25 billion Western Australia - China LNG contract**.

Of note, TAFE International WA was recently awarded a four-year, $50 million contract by the Arabian Gulf State of Qatar to provide training for the petroleum sector.

- Further supporting the State's oil and gas sector is the world-class **$200 million fabrication and marine precinct** being developed at Jervoise Bay. This infrastructure will provide the platform for companies to participate in contracts worth billions of dollars in the offshore oil and gas sector.

The Government's significant investment at Jervoise Bay, in concert with the synergies created by the presence of defence and other marine oriented industries, provides a strategic location for the development of a world-class industry cluster capable of attracting additional investment and knowledge to the State.

- Successful **partnership arrangements** exist overseas, where Government has provided the seed funding to establish an industry training centre, with this contribution matched in kind by industry through the ongoing provision of current equipment, technology and expertise.

The Taskforce recommends that the State Government commission an independent feasibility study to assess the viability of a specialised oil and gas training facility at Jervoise Bay, including the potential for a Government-industry partnership.

Burrup Skills Taskforce Report
To the Government of Western Australia

Emerging Industries on the Burrup: Skill Needs and Strategies

1. Introduction

In Western Australia a world-scale liquefied natural gas (LNG) and gas processing precinct is imminent on the Burrup Peninsula, near Karratha. This includes the continued expansion of the Woodside LNG project, following the North West Shelf Joint Venture partners' successful negotiation of a 25-year, $25 billion contract to supply LNG to China. In addition, several gas processing and petrochemical projects are planned or under consideration. These gas-to-liquids projects represent a new value-adding industry for Western Australia. As shown in the table below, the Burrup projects will generate significant investment and employment.

Company	Project Type	Capital Value	Construction Jobs	Operations Jobs
Burrup Fertilisers	Ammonia	$600 million	500	60
Dampier Nitrogen	Ammonia and Urea	$900 million	1,000	120 *
GTL Resources	Methanol	$600 million	600	65 *
Japan DME	Dimethyl Ether	$1 billion	1,000	150
Methanex	Methanol	$2 billion	1,000	100 *
Woodside Energy	LNG Expansion (Trains 4 and 5)	$2.4 billion	2,000	150

** Denotes Burrup Skills Taskforce estimate. Other estimates from Department of Minerals and Petroleum Resources, Prospect Magazine, December 2002 - February 2003.*

1.1 Burrup Skills Taskforce Terms of Reference

The planned developments on the Burrup present a significant opportunity to build upon the State's existing skill capacity and create substantial employment for Western Australians. Further, there is the potential to establish Western Australia as an international centre of expertise and training in the oil, gas and petrochemical industries. To ensure that Western Australia obtains the optimum benefit associated with the developments on the Burrup, in August 2002 the State Government through the then Minister for Training, the Hon John Kobelke MLA, established the Burrup Skills Taskforce. This provided a forum through which Government, industry and union representatives could collaborate in the development of strategies to meet the industry's need for a highly skilled workforce, while also addressing the State Government's objective of maximising job opportunities for Western Australians.

The Taskforce was chaired by Mr Norm Marlborough MLA, Parliamentary Secretary to the (then) Minister for Training, and comprised key industry representatives and stakeholders with expertise in the construction and/or operations skill requirements of existing and planned developments on the Burrup:

- Mr Norm Marlborough, MLA (Chair);
- Mr Ken Beynon, Project Director, Dampier Nitrogen;
- Mr Jock Ferguson, State Secretary, Australian Manufacturing Workers Union;
- Mr Larry Goodyear, Area Manager Western Australia, Methanex Australia;
- Mr Ian Hall, Executive Officer, Metals, Manufacturing and Services Industry Training Council (ITC);
- Dr Brian Hewitt, Managing Director, Clough Engineering Ltd;
- Mr Michael Kendal, Operations Manager, GTL Resources;
- Mr Vikas Rambal, Executive Director, Projects, Burrup Fertilisers Pty Ltd;
- Mr Roy Thompson, Manager Offshore Projects, Woodside Energy Ltd;
- Mr Kevin Vaz, Manager Perth Office, Itochu Australia Pty Ltd;
- Mr Mark Warner, Executive General Manager Western Region, United KG; and
- Ms Valerie Noy, Department of Education and Training (Taskforce Executive Officer).

The Taskforce Terms of Reference were to prepare a report for the State Government outlining strategies to enable Western Australia to realise the full potential of the Burrup projects, from an industry skilling perspective as well as from a Western Australian employment perspective. In developing the report, the Taskforce was asked to consider:

- The skill/occupational requirements and magnitude of labour demand associated with the projects': (1) engineering/fabrication/construction phase and (2) operations phase.
- Other resource development projects impacting on Western Australian skills demand and supply.
- Specific areas of specialisation/expertise that may initially need to be sourced from interstate or overseas and future strategies for the acquisition of relevant skills/expertise within the Western Australian labour force.
- Appropriate skill development strategies, including strategies for increasing local employment.
- Employment and skill development opportunities for Indigenous people, including employment-based training and support for Indigenous enterprises seeking to supply goods and services on the Burrup.
- The potential for a specialist training facility to service the oil, gas and petrochemical industries.

1.2 Methodology

As outlined previously, membership of the Taskforce included representatives from the major companies planning developments on the Burrup. During August to December 2002 members of the Taskforce convened on several occasions to clarify:

- The expected timing and labour profile of the planned Burrup projects. Data supplied by Worley Pty Ltd[2] provided an initial basis for quantifying the projects' construction and operations workforce. These estimates were subsequently modified in line with more specific details provided by the individual project representatives.
- The specific skill and occupational requirements of the projects, including relevant qualifications/experience and potential skill supply strategies.

The Chair of the Taskforce and the Executive Officer visited the Pilbara region to view the existing industry development on the Burrup and to meet with training providers, industry and local representatives in Karratha and Roebourne. This included discussions with representatives from:

- Apprenticeships Western Australia;
- the New Apprenticeship Centre;
- Woodside Energy Ltd;
- Pilbara TAFE (Karratha and Minurmarghali Mia campuses);
- the Shire of Roebourne;
- the Pilbara Area Consultative Committee; and
- the Karratha and Districts Chamber of Commerce.

Consultations were also conducted in the Perth metropolitan region with peak industry associations, including the Australian Petroleum Production and Exploration Association (APPEA) and the Chamber of Minerals and Energy. Additionally, the Taskforce visited training facilities in the Perth metropolitan region relevant to the oil, gas and chemical processing industries. Please refer to Appendix 1 for a complete list of individuals consulted in the preparation of this report.

[2] Worley Pty Ltd was commissioned by the Department of Education and Training to provide regular updates on the skill requirements associated with major planned Western Australian resource development and infrastructure projects.

1.3 Structure of the Report

The remaining sections of this report are structured as follows:

- Section 2: Burrup Labour Demand Profile
- Section 3: Construction Skill Requirements
- Section 4: Processing Skill Requirements
- Section 5: Opportunities for Local Indigenous People
- Section 6: Skill and Training Issues

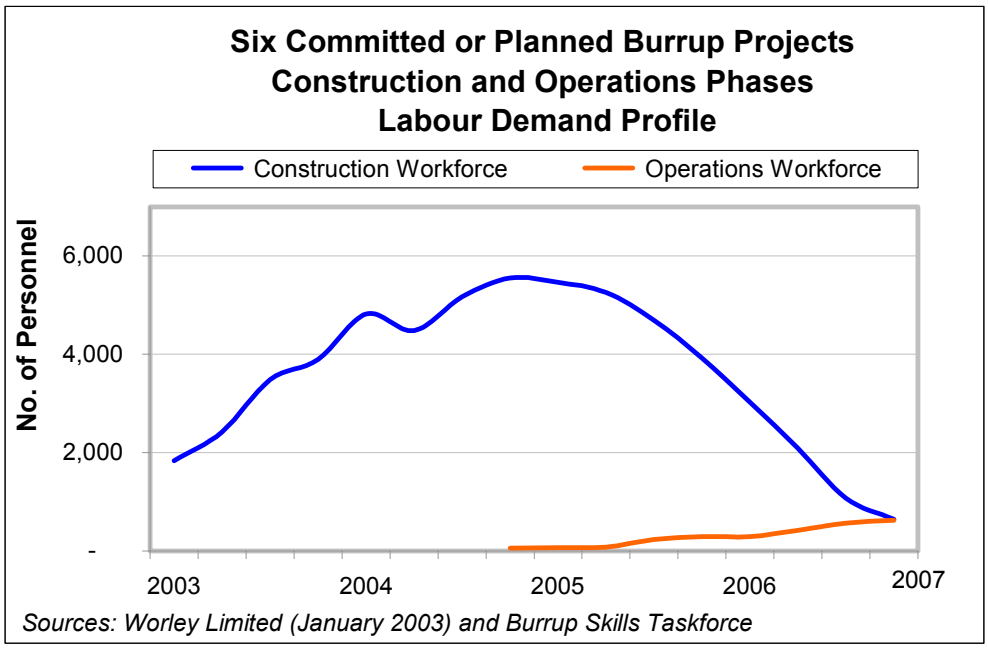
2. Burrup Labour Demand Profile

This report focuses on six projects on the Burrup Peninsula which are committed or expected to proceed in the next 1-3 years, these being the:

- Woodside LNG expansion (Trains 4 and 5);
- Burrup Fertilisers ammonia plant;
- Methanex methanol plant;
- Dampier Nitrogen ammonia/urea plant;
- GTL Resources methanol plant; and
- Japan dimethyl-ether plant.

5 Downstream Gas Processing Projects

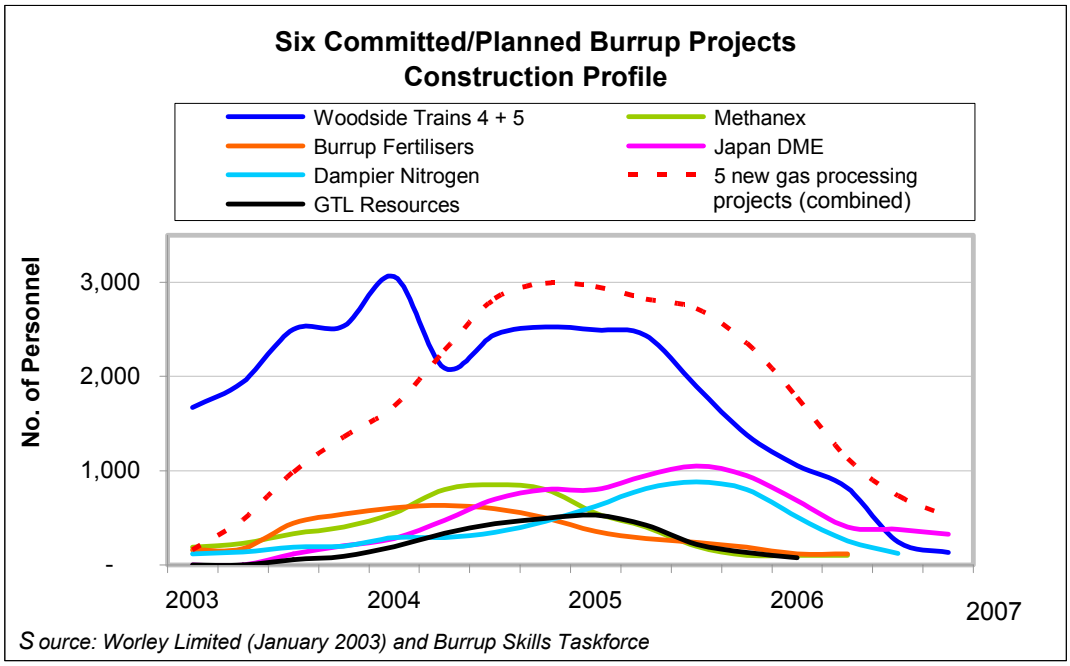
Within this report the 'construction phase' of projects is defined as encompassing the engineering/fabrication/construction stages. As shown in the following graph, the six committed/planned projects on the Burrup will collectively generate a peak construction workforce of almost 6,000 people and a long-term operations/maintenance workforce of more than 600 people.



Sources: Worley Limited (January 2003) and Burrup Skills Taskforce

3. Construction Skill Requirements

The following graph shows the construction labour demand profile for each of the six committed/planned Burrup projects. The Woodside LNG Train 4 expansion and the Burrup Fertilisers ammonia plant are the first projects to proceed, with the other projects expected to follow.



Source: Worley Limited (January 2003) and Burrup Skills Taskforce

The following table shows the predicted average annual requirement for skilled and semi-skilled personnel during the construction of the six Burrup projects. Across all occupational groups, the most significant demand is expected for metal tradespersons, with more than 1,700 required on the Burrup by 2005. There will also be substantial demand for a range of semi-skilled workers, with in excess of 1,500 needed. Drafting/design and engineering skills will mainly be required in the early stages of the projects, with the highest level of demand expected in 2003 and 2004, while the requirement for management/supervisory personnel will peak during 2004 – 2005.

Burrup Projects - Construction Phase
Average Annual Demand for Major Occupational Groups

Occupation	2003	2004	2005	2006
Metal Trades	980	1,646	1,734	436
Electrical/Electronic/Instrument Trades	107	193	239	64
Other Trades *	206	369	469	119
Subtotal Trades	**1,293**	**2,209**	**2,441**	**620**
Selected Semi-skilled Personnel * *	710	1,270	1,545	370
Management	361	661	646	154
Engineering	258	267	94	40
Drafting	292	289	89	45
Administration	66	93	82	60
Total	**2,980**	**4,789**	**4,897**	**1,289**

Source: Worley Limited (January 2003) and Burrup Skills Taskforce.
** Includes carpenters, painters and cooks/chefs. * * Includes mobile plant operators, crane operators, riggers, doggers, scaffolders and trades assistants.*

3.1 Trades

The following table shows the annual average requirement for tradespersons on the Burrup. Across the metal trades, demand will be strongest for boilermakers with more than 400 required during 2004 and 2005. Over this period there will also be a substantial requirement for plate welders, pipe welders and pipe fitters with in excess of 300 required in each of these occupations.

Similarly, the demand for other trades areas is anticipated to escalate during 2005, with an average annual requirement for:

- 239 electrical/instrumentation tradespersons;
- 190 carpenters;
- 157 painters and;
- 122 chefs/cooks.

Burrup Projects - Construction Phase Average Annual Demand for Tradespersons				
Occupation	**2003**	**2004**	**2005**	**2006**
Boilermaker	273	451	430	113
Welder (Plate)	203	338	320	76
Welder (Piping)	184	311	321	85
Pipe Fitter	159	270	307	80
Mechanical Fitter	99	188	217	46
Sheet Metal Worker/Insulator	62	88	140	37
Subtotal Metal Trades	**980**	**1,646**	**1,734**	**436**
Electrical/Electronic/Instrument Tradesperson	107	193	239	64
Carpenter	73	145	190	47
Painter	90	137	157	43
Chef/Cook	44	88	122	29
Subtotal Other Trades	**206**	**369**	**469**	**119**
Total Trades	**1,293**	**2,209**	**2,441**	**620**

Source: Worley Limited (January 2003) and Burrup Skills Taskforce

In addition to the above trade areas, industry representatives have highlighted a need for:

- electrical/electronic tradespersons with instrumentation skills/experience;
- metal tradespersons with knowledge/experience in specialist welding codes required for plate welding, pipe welding and pipe fitting;
- metal tradespersons with expertise in non-destructive testing; and
- cryogenic insulation/cladding. This specialisation involves the application of insulation materials to machinery and piping systems, involving processes/materials at very low temperatures, usually below -101°C.

Existing Employment

At the 2001 Census, there were 21,301 mechanical/engineering tradespersons, 14,736 electrical/electronics tradespersons, 5,572 carpenters/joiners, 3,133 painters and 4,112 chefs/cooks employed across all industries in Western Australia.

Worley estimates that there were 1,700 metals/engineering tradespersons and 450 electrical/electronic/instrumentation tradespersons employed on committed projects in Western Australia during 2002. The number of other tradespersons employed on committed projects was comparatively small: painters (50), cooks/chefs (44) and carpenters (35).

Publicly Funded Training Provision

In 2003 the State Government has allocated $35 million to publicly funded metals/engineering and electrical/electronic training programs. About $16.8 million of this funding is allocated to apprenticeships and post-trade qualifications relevant to the skill requirements on the Burrup.

In January 2003, there were 2,155 metals/engineering apprentices and 1,534 electrical/electronic/instrumentation apprentices in training in Western Australia.

Recommended Skill Supply and Training Strategies - Trades

- **Refresher training programs** to assist former metals/engineering and electrical/electronic tradespersons to return to the industry.

- **Expansion of accelerated trade training programs in metals/engineering and electrical/instrumentation**, including adult apprenticeships for existing personnel. A *Fast Track Apprentice Program* is currently being piloted by the Metals, Manufacturing and Services ITC, with funding support from the Department of Education and Training. The program incorporates flexible, on-the-job learning and upskilling strategies for existing employees, with relevant experience but who do not possess a trade qualification.

- **Post-trade training/upskilling of existing metals/engineering tradespersons** (intensive training programs) in the following high demand skill areas relevant to plate welding, pipe welding and pipe-fitting *(note welding acronyms are included in Appendix 2)*:

  - ► non-destructive testing;
  - ► specialist welding codes/standards (ASME IX, AS4041, ANSI B31.3, AS1554.1SP, AWS and AS/NZS 3992);
  - ► appropriate welding procedures (SMAW, GTAW, SAW, GMAW, FCAW); and
  - ► experience in the use of the following welding alloys/materials (carbon steel, low temperature carbon steel, stainless steel, alloy steel, inconel, incaloy and chrome/moly).

- **Post-trade training/upskilling of electrical/electronic tradespersons**, with a focus on instrumentation.

- Pursue the development of **an accredited training program in cryogenic insulation/cladding**.

- **Retain key construction phase tradespersons for the operations/maintenance phase**. Based on discussions held with the project representatives, some of the construction tradespersons are likely to be recruited for the operations/maintenance phase of the projects. These tradespersons are highly valued as they know the project 'inside and out'.

- **Encourage industry to employ apprentices**. A targeted marketing strategy could be initiated to increase industry take-up of metals/engineering and electrical/instrumentation apprentices (eg promoting apprenticeships as an investment in companies' future).

3.2 Semi-skilled Personnel

The Burrup projects will generate demand for a range of semi-skilled personnel, with a peak requirement in 2005 for trades assistants, mobile plant operators, crane operators, riggers/doggers and scaffolders.

Burrup Projects - Construction Phase Average Annual Demand for Semi-skilled Personnel				
Occupation	**2003**	**2004**	**2005**	**2006**
Trades Assistant	244	379	456	46
Rigger/Dogger	93	194	221	53
Mobile Plant/Crane Operator	85	141	195	45
Scaffolder	73	145	187	95
Concreter	86	157	167	45
Steel fixer	72	131	162	46
Labourer/Other Worker	56	123	159	41
Total Selected Semi-skilled Personnel	**710**	**1,270**	**1,545**	**370**

Source: Worley Limited (January 2003)

Industry representatives have highlighted a need for:

- training in elevated platform work; and
- experienced structural riggers.

Existing Employment

At the 2001 Census, more than 6,400 people in the State were employed as mobile plant machinery/vehicle operators, encompassing the operation of bulldozers, backhoes, excavator, loaders, graders and other mobile equipment/vehicles. With respect to employment in other semi-skilled occupations, there were 3,790 trade assistants, 1,836 concreters, 1,146 crane operators, 580 construction riggers, 557 scaffolders, 210 steel fixers/erectors and 71 crane chasers.

Worley estimates that 130 riggers/doggers, 70 scaffolders and 102 mobile plant/crane operators were employed on committed resource development projects in the State during 2002.

Current Publicly Funded Training Provision

Over the past five years, the State Government has allocated approximately $10 million to publicly funded training programs in construction related skills areas such as rigging, dogging, scaffolding and mobile plant operations - creating over 3,400 training places.

Recommended Skill Supply and Training Strategies – Semi-skilled Occupations

- **Intensive mobile plant training programs, with a WorkSafe licenced outcome, targeting existing workers**. Ideally these programs should be delivered on-the-job. There is a range of nationally accredited training programs relevant to mobile plant operations and construction related areas such as rigging, dogging and scaffolding. Alternatively, relevant units of competency can be selected from the following Training Packages as the basis for customised training programs:

  - ► Transport and Distribution Training Package;
  - ► Civil Construction Training Package;
  - ► General Construction Training Package; and
  - ► Metal and Engineering Training Package.

3.3 Engineering Professions

The following table shows that the Burrup projects will generate the greatest demand for engineering professionals during 2003–2004. Demand is anticipated to be highest for instrument/electrical engineers and mechanical engineers, with in excess of 80 required during this period.

Burrup Projects - Construction Phase Average Annual Demand for Engineering Professionals				
Occupation	**2003**	**2004**	**2005**	**2006**
Instrumentation/Electrical Engineer	81	87	29	10
Mechanical Engineer	76	81	26	10
Structural Engineer	55	64	26	10
Process Engineer	33	28	11	5
Project Engineer	7	3	1	5
Civil Engineer/Surveyor	7	4	1	—
Total Engineering Professionals	**258**	**267**	**94**	**40**

Source: Worley Limited (January 2003) and Burrup Skills Taskforce

The demand for engineering, associated with the Burrup projects, is expected to peak within the next 12-18 months. As highly experienced engineers will also be sought for other developments within and outside of Western Australia, companies are likely to recruit from the local, interstate and international markets to address their requirements as the labour market tightens.

Existing Employment

At the 2001 Census, 7,835 Western Australians were employed in the engineering professions. The most significant numbers were employed as civil engineers (1,679), electrical/electronic engineers (1,409), mechanical engineers (966), mining engineers (701) and petroleum engineers (359).

Worley estimates that there were more than 500 engineers employed on committed resource development projects in the State during 2002, comprising approximately 120 mechanical engineers, 115 instrument/electrical engineers, 80 structural engineers, 75 process engineers, 65 project engineers and 50 civil engineers.

Current Training Provision

The following table shows that in 2002 there were more than 4,000 students enrolled in university engineering programs in Western Australia, with the University of Western Australia and the Curtin University of Technology accounting for the vast majority of these enrolments. *Note: these figures do not include overseas students.*

WA Universities - Engineering Related Enrolments * 2002					
Qualification	**Curtin**	**ECU**	**Murdoch**	**UWA**	**Total**
Doctorate	6	7	14	104	131
Masters	61	4	2	30	97
Post Graduate	20	-	4	-	24
Bachelor Honours	7	-	3	35	45
Bachelor	1,651	335	153	1,623	3,762
Associate Degree	44	-	-	-	44
Total	**1,789**	**346**	**176**	**1,792**	**4,103**

Source: Department of Education Services, Higher Education Course Statistics 2002

** Enrolments exclude fee-paying overseas students*

The following table shows that across the engineering disciplines, the most significant proportion of enrolments were in the fields of:

- mechanical engineering (16%);
- electrical/electronic engineering (14%);
- computer engineering (14%); and
- mining engineering (9%).

WA Universities - Engineering Related Enrolments * by Field 2002				
Engineering Field	Higher Degree	Bachelor Degree	Associate Degree	Total
Mechanical Engineering	30	646	-	676
Electrical & Electronic Engineering	67	525	1	593
Computer Engineering	11	573	-	584
Mining Engineering	51	305	-	356
Structural Engineering	1	233	-	234
Civil Engineering	14	219	-	233
Chemical Engineering	6	194	-	200
Manufacturing Engineering	8	120	-	128
Environmental Engineering	26	95	-	121
Surveying	3	93	23	119
Process & Resources Engineering	-	2	-	2
Other Engineering * *	80	757	20	857
Total	**297**	**3,762**	**44**	**4,103**

Source: Department of Education Services, Higher Education Course Statistics 2002
** Enrolment numbers exclude fee-paying overseas students * * Other Engineering includes Industrial, Materials, Geotechnical/Geomatic Engineering, Mapping Science, Communications Technologies, Ocean Engineering, and Food Processing Technology*

Recommended Skill Supply and Training Strategies – Engineering Professions

- **Maintain university engineering provision**. As shown in the preceding table, there are a significant number of tertiary enrolments across the spectrum of engineering disciplines. The relatively consistent high demand for engineers supports the continuation of this training effort.

- **Promote the engineering professions to prospective university entrants**. Despite the high level of enrolments in tertiary engineering programs, research undertaken by the Chamber of Minerals and Energy indicates that there has been a declining number of students enrolling in these programs. The Chamber suggests that this issue needs to be jointly addressed by Government and industry. Potentially, a promotional strategy to increase awareness of the range of career opportunities available in the engineering professions could be targeted to high school students.

3.4 Draftspersons/Designers

As indicated in the table below, the demand for drafting/design associated with the Burrup developments is expected to peak in 2003-2004. Industry has confirmed a need for draftspersons with knowledge/experience in specialist software packages such as Project Design System (PDS), Project Design Management System (PDMS) and Autoplant.

Burrup Projects - Construction Phase Average Annual Demand for Draftspersons/Designers				
Occupation	**2003**	**2004**	**2005**	**2006**
Civil/Structural Designer	100	99	30	15
Instrument/Electrical Designer	100	97	30	15
Mechanical/Piping Designer	92	93	29	15
Total Drafting/Design	**292**	**289**	**89**	**45**

Source: Worley Limited (January 2003) and Burrup Skills Taskforce

Several of the planned developments on the Burrup are based on similar plants operating in other countries. As such, some of the drafting/design for the new plants will occur overseas.

Existing Employment

At the August 2001 Census, there were 2,459 Western Australians employed in drafting/design related occupations. Worley estimates that there were approximately 160 mechanical/piping designers, 130 instrument/electrical designers and 100 civil/structural designers employed on committed WA resource development projects in 2002.

Publicly Funded Training Provision

From 1999 – 2002, the State Government has funded more than 6,000 training places in publicly funded drafting/engineering training programs, worth an estimated $9.5 million.

Recommended Skill Supply and Training Strategies – Drafting/Design

- **Brief, intensive upskilling programs for existing designers** in specialist software packages such as PDS, PDMS and Auto Plant.

- **Upskilling programs for existing draftspersons in software packages** such as XSteel and Consteel.

- **Progress the introduction of a new traineeship in drafting encompassing specialist software packages**. A traineeship in drafting has been developed (at AQF level V) in consultation with industry which covers specialist software packages. It is envisaged that this traineeship will be introduced during 2003.

3.5 Management and Administration Personnel

Management personnel will be required for the Burrup projects, both on-site and in Perth. The most significant demand across the construction and operations phases of the projects will occur in 2004. Within the resources sector, specific managerial occupations that are persistently reported to be in short supply include experienced supervisors/forepersons, procurement/expediters, quality assurance and quality control inspectors, and quantity surveyors.

Burrup Projects (Construction Phase)
Average Annual Demand for Management/Administration Personnel

Occupation	2003	2004	2005	2006
Management (Project)	59	115	138	29
Trades Supervisor/Foreperson	112	177	127	33
QA/QC/QS Inspector	48	91	85	23
Procurement/Expediter	60	115	114	28
Planner/Scheduler	84	163	182	40
Administration	66	93	82	60
Total Management and Administration	**427**	**753**	**728**	**214**

Source: Worley Limited (January 2003) and Burrup Skills Taskforce

Existing Employment

At the 2001 Census, almost 9,200 Western Australians were employed in managerial/supervisory positions associated with the building, construction and resource development industries. This comprised 3,190 building and construction managers/supervisors, 4,860 engineering/distribution/process managers and 1,110 trade supervisors.

Current Training Provision

Currently, more than $6 million worth of publicly funded management related programs are provided in Western Australia, creating more than 5,100 training places annually. This includes more than 400 training places in frontline management programs each year.

Recommended Skill Supply and Training Strategies – Management and Administration

- **Frontline management training** for existing employees. There are a number of nationally recognised qualifications and accredited courses in frontline management. Alternatively, a relevant suite of competencies can be selected from the Business Services Training Package as a basis for customised training programs.

- **Short, intensive training programs covering areas such as project management, procurement and contracting**. Potentially such programs could be based on relevant units of competency within the Business Services Training Package. In addition, the Transport and Distribution Training Package includes qualifications and units of competency relating to logistics management.

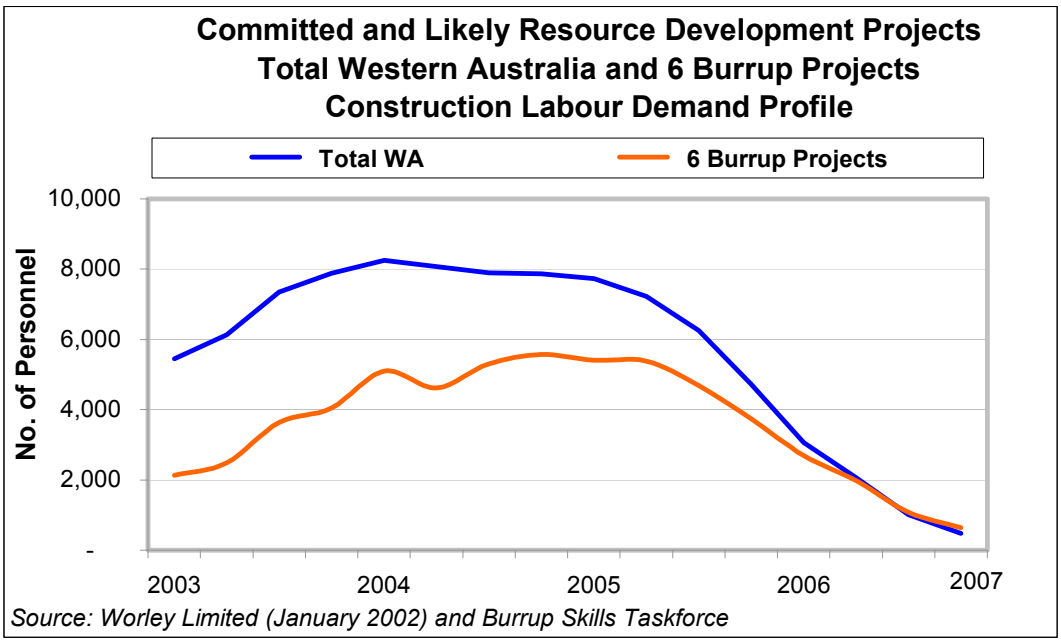
- **Company management succession strategies**. An issue that repeatedly arises in the oil and gas industries is that a significant proportion of the workforce is over 45 years of age. Given that employees in this age group will progressively be retiring, companies will need to start implementing relevant training, mentoring and skill development strategies to ensure the longer-term availability of suitably skilled managerial and supervisory employees.

- **Continue to promote traineeships in business and business administration**. Previous surges in resource development activity have demonstrated that the Western Australian labour market can readily accommodate increases in demand for administration staff. It is therefore suggested that current training provision be maintained, with an emphasis on traineeships in business or business administration as a means of providing employment-based training opportunities for the local community.

3.6 Other Projects Impacting on Construction Skills Demand and Supply

In addition to the six major projects committed or planned on the Burrup, the table on the following page lists in excess of $20 billion other projects committed, planned or under consideration in the State. Although the timing and eventuality of the full range of these projects is not known, some of these projects will proceed and impact upon the demand for skilled Western Australians.

As shown in the following graph, based on Worley's estimates of WA resource development projects that are committed or likely to proceed, the demand for construction personnel will peak during 2005 at a level of about 8,000 persons, with the six Burrup projects accounting for about 70% of the expected demand.



Source: Worley Limited (January 2002) and Burrup Skills Taskforce

In addition to resource development projects in Western Australia, major projects in other state/territories and off-shore, can be expected to draw from the State's workforce. Notable developments include the planned Phillips Petroleum LNG facility at Wickham Point near Darwin and the Bass Gas project in Victoria, which is likely to have some of its components built in Western Australia.

Other Committed or Planned Resource Development Projects Impacting on the Supply and Demand for Skills in Western Australia

Company	Project	Location	Capital Value ($ Millions)	Construction Jobs	Operations Jobs
Alcoa of Australia	Alumina refinery/bauxite mine expansion	Wagerup	$995	1,500	250
Austeel Pty Ltd	Mine and HBI plant	Fortescue/Cape Preston	$3,000	5,000	1,050
BHP Billiton/Ravensthorpe Nickel	Nickel mine	Ravensthorpe	$950	1,200	300
BHP Iron Ore Pty Ltd	Iron ore mine and infrastructure	Pilbara	$1,000	500	200
Chevron Australia Pty Ltd	Gorgon gas/condensate project	Carnarvon offshore basin	$4,000	2,000	120
HISmelt Corporation	HISmelt pig ironand steel plant	Kwinana	$1,200	320	80
Hitec Energy	Manganese dioxide project	Port Hedland	$136	N/A	115
Hope Downs	Iron ore mine	Hope Downs	$1,050	500	300
Jubilee Mines	Nickel mine	Cosmos Deeps	$33	15	55
Millenium Inorganic Chemicals	Titanium dioxide plant expansion	Kwinana	$470	500	200
Mount Gibson Iron Ltd	Iron pellet plant	Mount Gibson	$500	N/A	N/A
Newcrest Mining Ltd	Gold mine expansion	Telfer	$1,000	N/A	810
Portman	Iron ore mine expansion	Koolyanobbing	$100	120	35
Sally Malay Mining Ltd	Nickel project	South of Kununurra	$55	150	120
Sasol Chevron Global Joint Venture	Gas-to-liquids fuels	Barrow Island	$2,000	2,500	200
WA Government	Various port upgrades	Geraldton, Albany	$220	N/A	N/A
Worsley Alumina Pty Ltd	Gold mine expansion	Boddington	$500	450	600
Various companies	Various	State wide	$3,000	N/A	N/A

Source: Prospect Magazine, December 2002 - February 2003, Department of Minerals and Petroleum Resources.

4. Processing Skill Requirements

4.1 Burrup Operations Workforce

The six committed/planned projects on the Burrup are expected to progressively become operational during 2005-2007, collectively generating a long-term operations workforce of 640 persons by 2007.

Six Committed/Planned Burrup Projects Total Operations Workforce in 2007	
Occupations	**Persons**
Control Room/Processing/Field Operators	202
Processing Supervisors	28
Subtotal Processing Operators and Supervisors	**230**
Metal Tradespersons	38
Electrical/Electronic/Instrument Tradespersons	48
Trades Assistants and Semi-skilled Workers	32
Warehouse/Purchasing/Shipping Personnel	27
Labourers and Other Workers	21
Subtotal Maintenance Personnel	**166**
Engineers *(eg electrical/instrumentation, process, production, maintenance, mechanical)*	48
Chemists, Lab Technicians and Other Technical Support	36
Subtotal Professional/Technical Personnel	**84**
Perth Management/Administration	96
On-site Management/Administration	64
Subtotal Management and Administration	**160**
Grand Total	**640**

Source: Burrup Skills Taskforce (January 2003)

With the exception of control room/process plant operators and a small number of specialised technical personnel, the ongoing operations/maintenance requirements of the plants will draw from many of the same skill and occupational areas as the construction phase. As skill supply strategies for these occupations have been covered in sections 3.1 - 3.5 of this report, this section will focus on control room/process plant operators and supervisors.

4.2 Importance of Training

Appropriate training is vital for the oil, gas and petrochemical sectors as demonstrated by the 1998 explosion and fire at the Esso gas processing plant in Longford, Victoria. This incident resulted in two fatalities and eight serious injuries. Victoria was left without gas for two weeks, at an estimated cost of $1.4 billion to businesses and the economy.

A Royal Commission attributed the Longford accident to a failure to train workers adequately in safety procedures. The Commission recommended that training, safety monitoring and emergency procedures be upgraded at the plant.

At a subsequent Supreme Court hearing in July 2001, the company was found guilty of 11 criminal charges relating to workplace safety, maintenance and training. The company was fined a record $2 million. Following this verdict, several lawsuits were filed against the company by businesses, consumers, the company's workers and their families. The company was subject to a $1 billion class action, believed to be the largest in Australian legal history. Although the class action was rejected by the Victorian Supreme Court in February 2003, two companies were successful in their claim for losses.

Following the Longford incident, the Victorian Government has implemented *Major Hazard Facilities Regulations*. Major hazard facilities are defined as sites that store or process large quantities of dangerous goods, including petroleum products and chemicals. Under the regulations these sites are required to demonstrate high standards of safe operation through a performance-based safety case approach. This process is monitored through the Victorian WorkCover Authority. This approach is likely to be considered by other Australian states/territories.

4.3 Chemical, Hydrocarbons and Oil Refining Training Package

The Chemical, Hydrocarbons and Oil Refining Training Package has been endorsed nationally and includes qualifications and units of competence relevant to process plant operations. As required for all nationally endorsed Training Packages, the Package was reviewed three years after its inception, with the aim of making enhancements to reflect the latest industry practices and standards. As the review was conducted 'post-Longford', the safety priorities of the industry are emphasised in the latest version of the Chemical, Hydrocarbons and Oil Refining Training Package (referred to as the PMA02), released in December 2002.

Modifications to the Training Package include revision of the health, safety and environment competency units. Additionally, all operations competencies in the Package now include an element covering the control of hazards, reflecting the changed Occupational Health and Safety Regulations in all states. The Training Package can be viewed at http://www.ntis.gov.au.

4.4 Control Room/Process Plant Operators

The following table presents the estimated number of control room/processing/field operators required for the six committed/planned Burrup projects. Although the first of these projects will not become operational until 2005, project representatives have advised that recruitment and training for positions will commence in 2004, as reflected in the table below. All six projects are predicted to be operational by 2007, with an estimated requirement for just over 200 control room/processing/field operators and approximately 30 process supervisors.

Burrup Projects (Operations Phase)
Average Annual Demand for Processing Operators/Supervisors

Occupation	2003	2004	2005	2006	2007
Control Room/Processing/Field Operators	—	57	115	187	202
Processing Supervisors	—	8	15	28	28
Sub-total Process Operators/Supervisors	—	**65**	**130**	**215**	**230**

Source: Burrup Skills Taskforce (January 2003)

As the gas processing and petrochemical industries are new to Western Australia, project representatives have indicated that initially, some specialist personnel will need to be obtained from the projects' overseas parent companies.

Project representatives have indicated that within the LNG sector, approximately five years on-the-job training is required for an employee with no prior processing experience to become fully competent. In the petrochemical sector, eight years or more on-the-job experience may be required for individuals with no prior processing training/experience, while 3-5 years on-the-job may be required for individuals with previous related experience.

Accordingly, project representatives have confirmed that their operations workforce will be comprised of a combination of senior experienced operators, intermediate level operators and entry level recruits (10%-30%). Representatives from projects such as Dampier Nitrogen and Methanex have indicated their intention to progressively train Australians, with a view to having a predominantly Australian workforce within 18 months.

In addition to the six committed/planned projects on the Burrup, it is anticipated that demand for process operators/supervisors will be generated from other Australian and offshore projects including the Phillips Petroleum Bayu Undan oil and gas platform and the planned LNG plant in Darwin.

Control room/process operators will also be sought for Floating Production, Storage and Offtake (FPSO) and Floating Storage and Offtake (FSO) facilities. These include the Woodside Enfield FPSO and Santos' Mutineer FPSO.

Existing Employment

At the 2001 Census, 1,000 Western Australians reported being employed as process plant operators in the chemicals, petroleum or gas sectors. A further 2,437 were engineering production system support workers and 115 were chemical production support workers.

Current Publicly Funded Training Provision

Approximately $3 million is allocated each year for publicly funded training programs in minerals processing and process plant operations, equating to about 1,600 training places.

Recommended Skill Supply and Training Strategies – Processing

- **Widespread industry adoption of the Chemical, Hydrocarbons and Oil Refining Training Package**. This Training Package has been developed to nationally endorsed standards, with the direct involvement and support of APPEA.

- **Develop a suite of core/generic competencies relevant to the Burrup projects from the Chemical, Hydrocarbons and Oil Refining Training Package**. Project representatives have confirmed that there are core process plant operator skills/competencies (eg areas such as heat exchange, fired heaters, compressors, reactors and distillation). Accordingly, there is scope to identify a suite of generic competencies that could be delivered from the Training Package, relevant to all of the Burrup gas processing projects.

- **Investigate industry demand for a traineeship in the petrochemicals processing**. In consultation with the Burrup petrochemical companies, determine the potential for and likely industry take-up of a traineeship in petrochemicals processing. There are two successful industry models that can be adapted to suit specific enterprise needs. These are:

  - the Certificate IV in Process Operations developed and implemented by the BP Oil Refinery, Kwinana, which is solely based on process competencies needed to work in the plant; and

  - a Certificate IV traineeship which utilises a mix of trades (either instrument/electrical or mechanical) combined with process operations skills, designed for those who operate and maintain small, isolated production plants.

- **Pursue a range of training delivery options for the core/generic components of the Training Package, including**:

  - **Simulator-based training relevant to industry control systems** – Most of the Burrup project representatives considered that simulator-based training would be a relevant method of supplementing the on-the-job training of control room operators. Representatives noted the significant expense of simulators and considered that there could be some synergies and benefits associated with companies sharing access to simulation facilities.

  - **Computer-assisted and online learning** – This can provide a practical means of reducing training 'bottle-necks' caused when several employees/trainees attempt to access a limited number of training resources.

- **Investigate the use of on-site, qualified Workplace Trainers and Assessors** to deliver the higher level competencies (ie levels III and IV) of the Chemical, Hydrocarbons and Oil Refining Training Package. The use of workplace trainers and assessors has many benefits including: more opportunity for on-the-job learning, less work disruption due to reduced off-the-job training and greater relevance of training with trainees competency assessed on the same equipment used in the workplace. In addition, time and training costs can be significantly reduced through a carefully managed program.

- **Partnerships between industry and Registered Training Organisations (RTOs)** involving the use of the enterprise's trainers/assessors for the delivery of the Chemical, Hydrocarbons and Oil Refining Training Package, followed by the RTO auditing the training/assessment process and on completion awarding the relevant statements of attainment or qualifications.

- **Develop refresher programs for process plant employees**. Once the plants on the Burrup become operational, there will be an ongoing need for refresher training for employees. Industry representatives have highlighted the importance of such training for infrequent occurrences such as plant shutdowns. In addition, there is a continuous need to reinforce occupational health and safety practices, hazards identification/control and appropriate emergency response procedures.

- **Continue to pursue collaborative training/education arrangements between the VET and university sectors to support the industries on the Burrup**. This could encompass the further development of complementary VET and tertiary programs, training pathways and the sharing of facilities and resources. For example, Murdoch University grants advanced standing within their Bachelor of Technology program to students completing the following programs at Challenger TAFE: the Diploma of Engineering (Instrumentation and Control) or the Advanced Diploma/Diploma of Electrotechnology (Electronics).

- **Assess the level of industry demand and support for the expansion of existing training facilities to service the oil, gas and chemical processing industries**. Project representatives expressed interest in the concept of a training facility, equipped with simulators and computer laboratories for generic plant operator training. Representatives generally agreed that it would be most practical for the facility to be located in the Perth metropolitan area.

- **Investigate the need for processing related training support at Karratha TAFE**. In addition to Perth facilities, Burrup project representatives suggested that some processing related training facilities may be required in Karratha to support the needs of employees, as well as individuals in the local community seeking employment opportunities in the industry.

4.5 A Strategic Opportunity for Western Australia

Western Australia supplies about 55% of Australia's total oil and condensate, 100% of its LNG and is the third largest producer of LNG in the world.

Western Australia is gaining international recognition for its productivity, efficiency and innovation in the oil, gas and wider resources sectors. The industry's ability to compete in the global arena was evidenced most recently with the successful negotiation of the $25 billion Western Australia - China LNG contract.

Higher Education and Training Facilities

The State also boasts significant oil and gas related education and training capability. It is noteworthy that TAFE International Western Australia was recently awarded a four-year, $50 million training contract by the Arabian Gulf State of Qatar, against worldwide competition.

Central TAFE's facilities include the Australian Oil and Gas Industry Training Centre at Subiaco which provides flexible, self-paced training in process plant operations from the Chemical, Hydrocarbons and Oil Refining Training Package. This training includes access to a separation processing plant.

Western Australia's universities offer a range of relevant engineering and science programs at degree and post-graduate level, as well as substantial research and development capacity. The Centre for Oil and Gas Engineering was established in 1995 as a joint venture between the University of Western Australia, Curtin University of Technology, Murdoch University and Woodside Petroleum. It has become a recognised centre of excellence in leading edge research and development for the oil and gas sector.

Jervoise Bay Fabrication and Marine Precinct

The State's oil and gas sector will be supported by the world-class, $200 million fabrication and marine precinct being developed at Jervoise Bay. This infrastructure will provide the platform for companies to participate in contracts worth billions of dollars in the offshore oil and gas sector, resources, marine and defence industries.

A Strategic Opportunity

Western Australia is uniquely placed to establish the State as a global centre for the oil, gas and petrochemical industries. In an address presented at the Offshore Europe 2001 Oil and Gas Conference in Aberdeen, **Premier Geoff Gallop promoted Western Australia as:**

> *'A potential regional headquarters servicing oil and gas opportunities in Australia and the Asia-Pacific region'.*

There is also the potential to build Western Australia's oil and gas education and training capability through the establishment of a state-of-the-art training facility. Currently the Australian Oil and Gas Industry Training Centre at Subiaco can deliver components of the Chemical, Hydrocarbons and Oil Refining Training Package up to AQF level II and some AQF level III units of competency. However, another training delivery site within an industrial area is required for the more advanced levels of the Training Package, which include gas testing.

Successful training centre models exist overseas where Government has taken a lead role by providing the seed capital to establish such facilities, with this commitment matched in kind through the ongoing industry provision of equipment and technology at the current industry standard.

The State's significant investment at Jervoise Bay, in concert with the synergies created by the presence of defence and other marine oriented industries, provides a strategic location for the development of a world-class industry cluster capable of attracting additional investment and knowledge to the State.

The Taskforce recommends that the State Government commission an independent feasibility study to assess the viability and level of industry support and commitment for a specialised oil and gas training facility at Jervoise Bay.

5. Opportunities for Local Indigenous People

The planned developments on the Burrup present an opportunity to increase skill development opportunities and employment prospects for the local Indigenous community. In addition to such opportunities during the construction and operations/maintenance phases of the projects, there is also the potential for Indigenous enterprises to supply goods and services on the Burrup.

5.1 Existing Employment

At the 2001 Census, Roebourne, Karratha and surrounds had a total Indigenous population of 1,672 persons. Of those 15 years and older (1,051 persons):

- 383 (or 36.4%) were recorded as being employed (note this includes those participating in Community Development Employment Project (CDEP) programs);
- 84 were unemployed, equating to an unemployment rate of 18.2%; and
- 590 (56.1%) were not in the labour market (ie not in employment or looking for work).

According to Centrelink, within Shire of Roebourne there were 213 Indigenous people receiving unemployment benefits as at January 2003.

5.2 Local Indigenous Employment, Education and Training Initiatives

A range of industry, State and Commonwealth Government initiatives are currently operating on and near the Burrup to promote positive employment and training outcomes for the local Indigenous Community. These include:

- The **Gumala Mirnuwarni** is an after school program including Education Enrichment Centres in Karratha and Roebourne, which is managed by the Polly Farmer Foundation, with funding from the Commonwealth, Hamersley Iron, Woodside Energy, Dampier Salt and the Department of Education and Training.

- The **Warrgamugardi Yirdiyabura program** is a collaborative initiative of Woodside Energy, Pilbara TAFE (Minurmaghali Mia campus), the Commonwealth Government (DEWR), the Ngarliyarndu Bindirri Aboriginal Corporation and Robe River Iron Associates. The program includes four months of pre-vocational training, followed by a 12 month traineeship with Woodside and local contracting companies.

- **Hamersley Iron's Aboriginal Training and Liaison unit** offers a range of programs for the local Indigenous community. This includes the coordination of traineeship and apprenticeship programs with mentoring and specialised support. Hamersley Iron provides a 12 month traineeship in engineering production or metalliferous mining. From 1992 – 2001, 62 Aboriginal trainees graduated from the program. On completion of the traineeship, students can receive a full year's credit toward an apprenticeship with Hamersley Iron.

- In April 2000, the **Ngarluma Yindjbarndi Foundation Limited** was established by the North West Shelf Joint Venture partners in collaboration with local Aboriginal communities to help provide long-term, sustainable support for education, training, employment and business development opportunities.

- The **Roebourne Enhancement Scheme** is a State Government initiative to improve infrastructure, housing and the provision of Government services for Roebourne residents. The Scheme promotes Indigenous employment and skills development within its infrastructure and maintenance program.

- **Eurest Australia's Indigenous Training and Employment Program** provides individuals with special support, work experience in Eurest's food/hospitality operations and the opportunity to complete a nationally recognised traineeship.

- **Pilbara TAFE** received a Western Australian Training Excellence Award (Access and Equity category) in 2002 for its delivery of training programs to support new enterprise opportunities for the Cheeditha Community associated with the redevelopment of the Cossack township.

- Aboriginal and Torres Strait Islander Commission (ATSIC) **Community Development Employment Projects** (CDEP) operate throughout Australia. The Ngarliyarndu Bindirri Aboriginal Corporation includes 14 CDEP organisations which operate in Roebourne, Karratha, Wickham and surrounding areas.

- **Aboriginal school-based traineeships** will commence in Karratha and Roebourne during 2003. This is a collaborative initiative involving the Department of Education and Training, ATSIC, DEWR, the Employment Directions Network, Pilbara TAFE and the Wila Gutharra Group Training Company, with industry, small business and community groups providing placements for students.

- The **Structured Training and Employment Project** (STEP) and **Corporate Leaders for Indigenous Employment Project** are Federal Government initiatives that offer financial assistance to businesses and community organisations to provide structured training and employment opportunities for Indigenous Australians.

- The Commonwealth, through DEWR, funds an **Indigenous Employment Project Officer**, based in Karratha, to work with the Pilbara Area Consultative Committee in facilitating positive employment outcomes for local Indigenous people.

- **Joint ventures leading to Indigenous training and jobs.** Memorandums of Understanding have been entered into at a national level involving ATSIC, major contracting companies and the resources industry. This new arrangement has seen the establishment of Ngarda Civil and Mining, a joint venture between the Henry Walker Eltin Group and the Ngarluma Yindjbarndi Foundation Limited. This successful partnership has secured a five-year civil contract with BHP on Finucane Island, creating 33 full-time Indigenous jobs.

  Similar arrangements have occurred at the national level between ATSIC and United KG, creating a number of job and training opportunities in the region for Indigenous people. It is clear to the Taskforce that this model will continue to grow, providing not only real jobs for the Indigenous community but also new challenges for training.

Current Publicly Funded Training (TAFE campuses at Karratha and Roebourne)

The Pilbara TAFE Minurmaghali Mia campus in Roebourne offers a range of programs for the local Indigenous community, including pathways to employment, general education, literacy skills, automotive, engineering, industrial skills, hospitality, office/clerical, community services, land conservation, horticulture and visual arts. Karratha TAFE also provides programs in numeracy, literacy, general education and employment skills.

In 2002, Pilbara TAFE estimates that there were more than 395 Indigenous students participating in training programs at the Minurmaghali Mia (236 students) and Karratha (159) campuses.

5.3 Indigenous Driving and Employment Issues

Despite the range of Indigenous initiatives currently underway, a major factor constraining employment is the fact that many local Indigenous people do not posses a driver's licence and have significant fines attached.

This limits employment options on major resource development sites, as a driver's licence is required for the use of on-site vehicles and is a pre-requisite for other mobile equipment/vehicle licences (eg forklifts, excavators). A further issue identified is that low literacy levels are likely to prevent some Indigenous people from performing well on the written driver's exam.

A number of relevant initiatives are currently underway in Western Australia including:

- Indigenous Driver Education Program – This is a Western Australia Police Service initiative conducted by Police and Aboriginal Police Liaison Officers, culminating in a written and oral test for a learner's permit.

- Aboriginal Road Safety Ambassadors (Burringurrah Community) – Roadwise is developing culturally appropriate information and liaising with the Aboriginal community to promote road safety issues.

- Youth Driver Development Program (Kalgoorlie-Boulder) – This program comprises a six module driver training course for Year 11 students. The program aims to develop sound attitudes towards driving and safety, while also providing driving instruction. This is a collaborative initiative involving the Chamber of Minerals and Energy ($10,000 contribution), Golden City Motors (two cars provided free of charge), Western Mining Corporation (another car made available), the Kalgoorlie-Boulder Chamber of Commerce and Industry (provides the fuel for the vehicles) and the Goldfields-Esperance Development Commission (supports the program with a grant from the Kalgoorlie-Boulder Development fund). This collaborative initiative provides a useful model for the implementation of similar programs in Roebourne and/or Karratha.

- The Employment Directions Network Centre in Karratha is currently pursuing the establishment of a driver training program for Roebourne. Approaches have been made to industry for a vehicle and funding is being sought for driving instructors.

Recommended Skill Supply and Training Strategies – Local Indigenous People

- **The establishment of an Aboriginal Economic and Employment Development Officer** (AEEDO) in Roebourne to coordinate training and employment opportunities for local Indigenous people on the Burrup and elsewhere.

- **An appropriately funded driver training scheme**. Suggestions included the development of mentoring based driver training programs and alternative assessment options for the written driver's exam.

- **A moratorium to remove outstanding driving fines** or a scheme enabling Indigenous people to acquire a driver's licence, gain employment and progressively pay their fines.

- **Continued support for the host of Indigenous training and employment initiatives** currently operating in the region.

- **Continue to work in partnership with CDEP** to provide pathways for participants into full-time employment. This can range from accredited training programs and work experience, through to offering the CDEP wage as an incentive to small business and community-based organisations which employ Aboriginal trainees and apprentices.

- **Encourage industry to adopt contracting and training practices that support the skilling and employment of Indigenous people.** For example, Woodside Energy includes a requirement for Indigenous employment within their tenders for contracted services. This is supported by the Warrgamugardi Yirdiyabura program.

- **Small business management training and advice for Indigenous enterprises** seeking to supply goods and services to projects on the Burrup. Relevant VET programs include the Diploma of Management Indigenous Organisations.

- **Cross-cultural training for non-Indigenous employees.** Relevant programs are conducted by the Ngurra Wangkamagayi and Wanu Wanu training enterprises, owned by the Aboriginal communities of Roebourne and Tom Price. These programs are designed to promote an understanding of Aboriginal culture, heritage and culturally appropriate communication protocols relevant to the workplace and the wider community.

6. Skill and Training Issues

6.1 Skill Shortages in the Oil and Gas Sector

In August 2002, Australian Competitive Energy, under the auspices of APPEA, convened a national Operations Managers Network Forum in Perth. The objective of the forum was to identify opportunities for industry collaboration in the development of strategies to improve industry performance and sustainability. The key priority arising from the forum was the need to '*Attract and retain a sustainable operations workforce*', with skill shortages identified as the most critical issue facing the industry.

Within the oil and gas sector, skill shortages are particularly evident for process plant operators and electrical/instrumentation tradespersons and technicians. A number of factors have contributed to this situation, including escalating industry demand and an ageing workforce. With the average age in the oil and gas industry estimated at 47 years, it is expected that a significant proportion of the workforce will retire in the next five years.

The Operations Managers Network has identified opportunities to improve labour flexibility, reduce costs and standardise competencies through:

- group training arrangements to support the development of a hydrocarbon-focused apprenticeship scheme;
- industry-wide adoption of the Chemical, Hydrocarbons and Oil Refining Training Package;
- the introduction of an internet-based industry competency register and retrieval system; and
- an increased emphasis on attracting young people into the industry. APPEA has produced a *Petroleum Industry Career Guide* outlining a range of career opportunities in the industry for use by students, career advisers and job seekers.

A sub-group of the Operations Managers Network is currently pursuing these and other options.

6.2 The Cyclical Nature of Skill Shortages and Declining Apprenticeships

The Commonwealth Government, through the state/territory offices of DEWR, monitors and assesses skill shortages and produces a national skill shortage list. An occupation is assessed as being in shortage when employers are unable to fill, or have considerable difficulty filling vacancies for an occupation, or specialisations within that occupation at (1) current levels of remuneration and conditions of employment, and (2) in a reasonably accessible location. In December 2002, DEWR assessed the following occupations as being in shortage both in Western Australia and nationally. *Note: The table below only includes those occupations relevant to the resources sector.*

National and WA Skill Shortages in Occupations Relevant to the Resources Development Sector

Professions	Trades
Chemical Engineer	Metal Fitter
Civil Engineer	Metal Machinist
Electrical Engineer	Welder
Mechanical Engineer	Sheetmetal Worker
Mining Engineer	

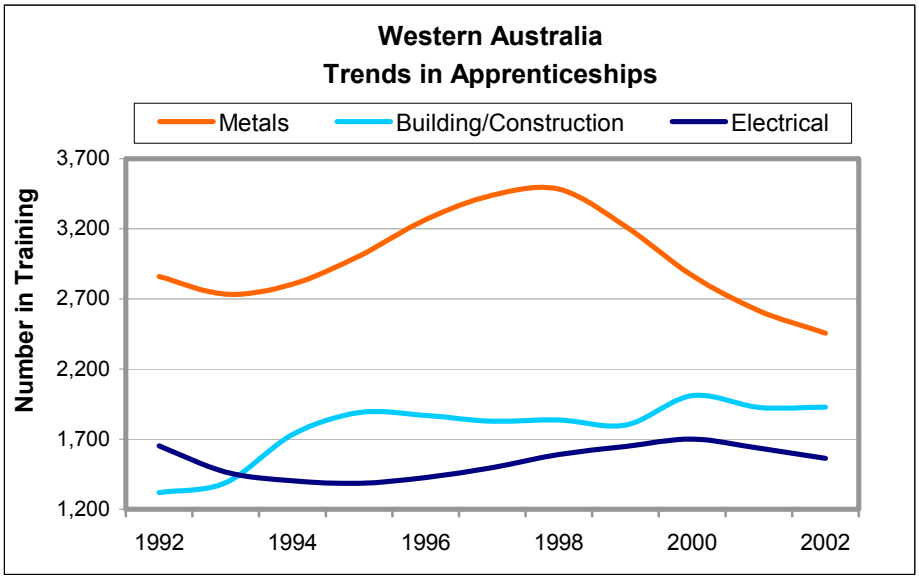
Source: DEWR, December 2002

Of note at the national level, shortages were reported for electricians, refrigeration/air conditioning mechanics and electronic equipment trades. However, these shortages were not identified in Western Australia during late 2002. With respect to the national and state/territory skill shortage lists, DEWR has indicated that although skill shortages are monitored closely, there may be localised or specialised shortages that are not reflected in the list.

The resources sector is strongly influenced by conditions in the world economy, which in turn impact on companies' employment and training practices. As a consequence of a reduction in training during periods of economic downturn, particularly apprenticeships, skill shortages regularly emerge as the economy recovers. Despite industry awareness of this issue, companies' 'bottom line' and tight profit margins are often cited as a major constraint to employing apprentices during periods of low activity.

The following graph illustrates that there has been a substantial downward trend in metal trades apprenticeships in Western Australia since 1998. Electrical/electronic apprenticeships declined during the mid-nineties and over the past two years. By comparison, building/construction apprenticeships have remained relatively steady, assisted in the last two years by demand in the housing sector generated by the First Home Buyer Grant.

Across the construction, mining and manufacturing industries, the ratio of apprentices/trainees to employed persons is 1 to 33 in Western Australia, while the comparative national average is 1 to 25.



Group training companies provide a partial solution to the issue of fluctuating industry activity and the associated take-up of apprentices, by enabling apprentices to be placed with different companies as required. However, group training schemes are also subject to the effects of low economic activity and for their viability require an adequate level of industry demand for the placement and rotation of their apprentices.

The State Government, through the Department of Education and Training, is pursuing counter-cyclical measures as a means of reducing skill shortages, with an emphasis on employment-based training and upskilling strategies targeting the existing workforce. This has included a pilot Fast Track Apprenticeship Program which incorporates flexible, on-the-job learning and upskilling for existing employees, with relevant experience but who do not possess trade qualifications.

6.3 Karratha TAFE and its Future

The consultations undertaken by the Taskforce in Karratha and Roebourne indicate that Karratha TAFE needs to play a pivotal role in educational outcomes for the region. TAFE is the only post-secondary institution within the locality of the Burrup and therefore significantly important to the future growth of the area. Estimates suggest that Karratha could have a population of more than 30,000 people within the next 15 years.

Karratha TAFE, in partnership with industry, is ideally placed to deliver innovative training programs, and provide education and training pathways for students in Years 10, 11 and 12 that lead to real jobs in the region's growing industries. Such training could provide industry with a motivated, highly skilled and young workforce, helping to overcome the ageing workforce issue in the oil and gas sector, while at the same time equipping students with skills that are in high demand worldwide.

Taskforce members were concerned to find that major resources enterprises on and near the Burrup were not using Karratha TAFE for the majority of their training needs, with the quality of training identified as a major issue.

Some of the difficulties associated with the present situation include the difficulty in retaining quality lecturers who are often 'head-hunted' by the private sector.

Consultations also revealed that during peak periods of activity, some enterprises do not release their apprentices/trainees for the formal component of their training at TAFE. Twelve hour work shifts was identified as a further constraint to attendance at TAFE.

The Taskforce considers that there is an onus on industry to support the training of apprentices/trainees not only by providing on-the-job training, but also by collaborating with the relevant training organisation to ensure that formal training requirements are met.

Recommendations - Karratha TAFE

- **Position Karratha TAFE as a 'shop window'** for a coordinated effort across the TAFE system to provide high quality, flexible and industry responsive training to support the developments on the Burrup.

- **Create a Karratha TAFE Business Manager** position to liaise with enterprises and access the entire TAFE network to provide excellence and relevance in training consistent with the needs of industry. This could include flying in lecturers with the relevant expertise on a needs basis.

- **The co-location of Year 10, 11 and 12 students at Karratha TAFE** as a means of aligning education and training pathways to local industry needs.

Consultations

The following individuals/organisations participated in discussions with members of the Burrup Skills Taskforce or contributed information for the Taskforce report.

Mr Bruce Abrahams, Business Development Manager, United KG
Professor Valerie Alder, Pro Vice Chancellor – Research, Murdoch University
Mr Dion Barnett, A/Campus Manager, Pilbara TAFE, Minurmarghali Mia Campus
Ms Jackie Bickendorf, Pilbara Area Consultative Committee
Mr Peter Brooke, STSC Computer Services Supervisor, Australian Submarine Corporation
Mr Bruce Butler, Production Manager, Woodside Energy Ltd
Mr Walter Cohn, Business Development Consultant, Worley Ltd
Mr Aldo Di Dio, Perth Operations Manager, Worley Limited
Ms Gillian Dyson, Apprenticeship/Traineeship Support Officer, Department of Education and Training
Mr Grant Fink, Hamersley Iron Field Officer, Apprenticeships Western Australia, Karratha
Mr Shane Fox, Regional Development Officer, Air Services Australia
Ms Peta Anne Frealay, Senior Consultant, New Apprenticeship Centre, Karratha
Ms Kay Gerard, Vice President, Karratha and Districts Chamber of Commerce
Mr Lyn Girdlestone, Director Training Services, CCI Training Services
Mr Malcolm Goff, A/Chief Executive, Office of Training, Department of Education and Training
Mr Geoffrey Graham, Training Coordinator, Australian Oil and Gas Industry Training Consortium
Ms Fiona Grierson, Regional Employment Coordinator – Pilbara, Department of Education and Training
Mr Steve Hislop, Regional Business Manager, RGIT Montrose
Mr Andrew Hu, Managing Director, Rapid Learning
Mr Lee Jackson, Executive Officer Human Resources, Chamber of Minerals and Energy
Mr Mike Jakins, Executive Officer, Processing Manufacturing ITC
Mr Glen Jennings, Program Manager IT and Electrotechnology, Pilbara TAFE, Karratha Campus
Mr Keith Jones, Senior Adviser – Community, Woodside Energy Ltd
Mr Reg Howard-Smith, Director Programs and Member Services, Chamber of Minerals and Energy
Mr Wolfgang Jovanovic, Manager Human Resources and Industrial Relations, Burrup Fertilisers
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Mr Kevin Richards, Roebourne Shire President
Mr John Rich, Senior Environmental Engineer, Dampier Nitrogen Pty Ltd
Mr John Robertson, Technical Director, Australian Competitive Energy
Mr John Rowe, Manager Apprenticeships Western Australia, Karratha
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Mr Colin Saunders, President, Australian Manufacturing Workers Union
Mr Ramesh Sodum, Project Director, Burrup Fertilisers
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Ms Susan Uquart, Marketing Executive - Corporate Development, RGIT Montrose
Ms Denise White, Director Training Services, Pilbara TAFE, Karratha Campus

Acronyms

AEEDO – Aboriginal Economic and Employment Development Officer
APPEA – Australian Petroleum Production and Exploration Association
AQF – Australian Qualifications Framework
ASME – American Society of Mechanical Engineers
AS/NZS – Australian Standard/New Zealand Standard (welding)
ATAL – Aboriginal Training and Liaison
ATSIC – Aboriginal and Torres Strait Islander Commission
AWS – American Welding Society
CDEP – Community Development Employment Project
DME – dimethyl ether
DEWR – Department of Employment and Workplace Relations (Commonwealth)
FCAW – Flux Cored Arc Welding
FPSO – Floating Production, Storage and Offtake
FSO – Floating Storage and Offtake
GMAW – Gas Metal Arc Welding
GTAW – Gas Tungsten Arc Welding
GTL – gas-to-liquids
ITC – Industry Training Council
LNG – liquefied natural gas
MLA – Member of the Legislative Assembly
NYFL - Ngarluma Yindjbarndi Foundation Limited
PDMS – Project Design Management System
PDS – Project Design System
PMA02 – latest version of the Chemicals, Hydrocarbon and Oil Refining Training Package (2002)
RTO – Registered Training Organisation
SAW – Submerged Arc Welding
SMAW – Shielded Metal Arc Welding
STEP – Structured Training and Employment Project
TAFE – Technical and Further Education
TEE – Tertiary Entrance Exam
VET – vocational education and training

DEPARTMENT OF EDUCATION AND TRAINING
RESPONSE TO THE BURRUP SKILLS TASKFORCE REPORT

Training Capability Assessment and Action Plan

Overall Assessment of Training Capacity

The Department of Education and Training has reviewed the preceding report and conducted an assessment of the training sector's capacity to address the skill priorities identified by the Burrup Skills Taskforce.

The State Government currently invests about **$60 million** annually in publicly funded training relevant to the resources sector, representing more than **30,000 training places**. Of this amount, approximately **$31 million** is directed to training programs that correspond with the specific skill priorities identified by the Burrup Skills Taskforce.

The construction training needs identified by the Burrup Skills Taskforce can be met within the existing State Government training budget by refocusing and targeting training with an emphasis on upskilling and 'just in time' solutions to address the industry's needs.

However, there are some areas which require further attention. Consultations undertaken by the Burrup Skills Taskforce confirmed the need for partnerships (1) between industry and the training sector and (2) across the TAFE network to address the following priorities:

- The need to increase the **flexibility, responsiveness and industry relevance** of training provided by Karratha TAFE. This includes an increased capacity to deliver **training in the workplace**, using the enterprise's own facilities/equipment to **optimise the relevance of the training**.

- Improved utilisation of the TAFE network to ensure **quality training provision** in regional areas. The Taskforce recommended that **Karratha TAFE** function as a 'shop window' or focal training delivery point for the TAFE system, servicing the industries on and near the Burrup.

- In keeping with continual and rapid advances in technology, the **currency of lecturers' industry knowledge** needs to be maintained.

Action Required

- The Department of Education and Training will invest **$1.5 million to expand the capacity of the VET sector** to develop industry responsive, 'just in time' training solutions. This can include the professional development of lecturers through return to industry programs, industry placements and tutoring/coaching in customised, workplace-based training delivery.

- A **coordinated approach across the TAFE network** to enhance the responsiveness, flexibility and industry relevance of publicly funded training available through Karratha TAFE. The Department will collaborate with TAFE Managing Directors to develop strategies, establish responsibilities and implementation timelines.

- The Department will establish a **Business Manager position** at Karratha TAFE to liaise with industries on the Burrup and source the most appropriate training expertise from across the TAFE network.

Metal Trades

Assessment of Training Capacity

The training system is well resourced to respond to the metal trades skill priorities identified by the Burrup Taskforce. This will include a refocus of existing delivery, with an emphasis on upskilling programs for the existing workforce and rapid-response training solutions.

Current Publicly Funded Training

- Over the last four years, metals related training programs have represented **7%** of total publicly funded training in the State, with this investment set to increase to **10%** in 2003.

- Approximately **$8.1 million** is allocated annually for metals training at the trade and higher qualification levels. This includes an investment of more than **$2 million** in recent times for training in the new welding codes

- About one-third of all metals training delivery is for apprenticeships. In February 2003, there were **2,155 metal trades apprentices** in Western Australia.

Priority Occupations	Peak Demand	Relevant Training Programs	Training Places 1999-2003	
			Annual Avg	Total
Metal Trades	**2004/2005**			
Boilermakers	**400 - 410**	Trade studies (fabrication)	1,289	6,447
		Trade studies (metals/engineering)	690	3,450
Mechanical fitters	**170 - 210**	Trade studies (mechanical)	1,580	7,900
		Trade studies (heavy duty automotive)	94	469
Pipe welders	**280 - 300**	Coded welding, pipe/plate welding	228	1,138
Plate welders	**310**			
Pipe fitters	**250 - 290**	Pipe fitting *(included in above fabrication/metals/engineering programs)*		
Non-destructive testing	**N/A**	Diploma of Engineering	94	468
Cryogenic lagging	**60**	*No available program - needs to be developed*		
Total Training Places			**3,974**	**19,872**
Average Annual Training Investment				**$ 8,100,000**

- Through the Department's *Competitively Allocated Training* programs, **$1.2 million** has been allocated in 2003 to public and private training providers to deliver programs in advanced/coded welding, fabrication and pipe fitting. These providers include the CCI Skills Centre, Challenger TAFE, South West Regional College of TAFE and XLT Industrial Training.

- The Department of Education and Training and the Metals, Manufacturing and Services ITC are currently piloting *a **Fast Track Apprentice Program***. The program has been developed to reduce the impacts of cyclical skill shortages in the metals/engineering and electrical/instrumentation trades. The program targets existing workers and incorporates flexible, on-the-job learning and upskilling strategies. There are **64 apprentices** in the program.

Training Providers

Registered Training Organisations Metal Trades	
Metro TAFE	Carlisle, Fremantle, Henderson, Midland, Subiaco, Thornlie, Rockingham
Regional TAFE	Albany, Bunbury, Geraldton, Karratha, Kalgoorlie, Narrogin, Northam, Port Hedland, Tom Price
Private Training Providers	CCI Skills Centre, BHP, Hamersley Iron, Komatsu Australia, Mission Australia, SMC Pneumatics (Australia), The Training and Skills Co., Total Corrosion Control, Skills Training and Assessment Centre, WA Skills Training, XLT Industrial Training, Caterpillar Institute (WA)

Non-training Supply Strategies

- Some short-term interstate migration is expected and possibly the issuing of temporary business entry visas, consistent with the considerable national and international exposure that the Burrup projects have received.

Potential Pool of Unemployed Persons with Relevant Skills

- Census data shows that there was a pool of unemployed Western Australians in 2001 with trade or higher level qualifications in the following areas: boilermaking/welding (628 unemployed persons); metal fitting/turning/machining (443); mechanical/industrial engineering (340); refrigeration/air conditioning mechanics (65); and precision metalworking (18).

Action Required

- Through the *Skilling WA* program, a further **$1 million** will be made available in 2003 for **upskilling programs** targeting the resources sector workforce. Registered Training Organisations, industry bodies and employee organisations are eligible to apply for this funding, in partnership with the specific enterprises seeking upskilling for their employees. The designated priority skill areas for this funding include advanced/coded welding processes and materials.

- In 2004 and 2005, the Department of Education and Training will consult with industry to re-confirm the Burrup skill requirements and ensure that the **relevant metals training priorities** (eg cryogenic insulation/cladding, refresher programs for former metal tradespersons, coded welding programs) are appropriately reflected within publicly funded training provision.

- Continued support for and **extension of the pilot *Fast Track Apprentice Program*** in 2003. The Department, in conjunction with the Metals, Manufacturing and Services ITC, will assess the industry demand for **additional accelerated metal trades programs**. Pending industry support and demand, further accelerated programs will be implemented in 2004.

Electrical/Instrumentation Trades

Assessment of Training Capacity

Instrumentation training requires further attention by the training sector in collaboration with industry. To date there has been relatively low enrolment numbers in these programs, despite persistent skill shortages being reported in this area. The reasons for this apparent discrepancy warrant investigation, in particular:

- industry's perceptions regarding the relevance of existing programs;
- factors influencing the student/industry uptake of training places;
- whether this training is being targeted and promoted appropriately; and
- potential opportunities for VET sector and industry partnerships.

Current Publicly Funded Training

- Electrical/electronics related training accounts for approximately 4% of publicly funded training in Western Australia. In relation to trades-specific electrical/electronics training, more than **3,300 training places** are funded annually, equating to an investment of **$8.7 million**.

- In February 2003 there were **1,534 electrical/electronic/instrumentation apprentices** in Western Australia.

- Electrical/instrumentation apprenticeships have been included in the pilot ***Fast Track Apprentice Program***.

Priority Occupations	Peak Demand	Relevant Training Programs	Training Places 1999 - 2003 Annual Avg	Total
Electrical Trades	**2005**			
Electrical/electronic tradespersons with instrumentation skills	**245**	Trade studies (electrical)	1,438	7,191
		Trade studies (automotive electrical)	109	547
		Trades studies (electronic)	465	2,326
		Trade studies (instrumentation/contro	414	2,072
		Electrotechnology	932	4,659
Total Training Places			**3,359**	**16,795**
Average Annual Training Investment				**$ 8,700,000**

Training Providers

Registered Training Organisations Electrical/Electronic/Instrumentation Trades	
Metro TAFE	Balga, Fremantle, Midland, Thornlie, Rockingham
Regional TAFE	Albany, Bunbury, Geraldton, Karratha, Kalgoorlie, Port Hedland, Tom Price
Private Training Providers	CCI Skills Centre, ITEC Training and Kinway, AEMS Training, Progressive Training Workplace Australia Group, College of Electrical Training (CET)

Non-training Supply Strategies

- As demand for electrical/electronic tradespersons and instrumentation specialisations peaks, some interstate or overseas recruitment may occur.

Potential Pool of Unemployed Persons with Relevant Skills

- Information from the Census indicates that in August 2001 there were 750 unemployed Western Australians with trade or higher qualifications in relevant areas: electrical/electronic engineering and technologies (689), electrical fitting/mechanics (211) and electronic equipment servicing (43).

Action Required

- In 2003, the Department of Education and Training's **$1 million *Skilling WA* program** will include **upskilling programs in instrumentation** for qualified electricians and electronics tradespersons.

- The continuation of the pilot ***Fast Track Apprentice Program,*** which includes electrical/instrumentation apprenticeships.

- The Department, in conjunction with the TAFE network and the Metals, Manufacturing and Services ITC, will **investigate the relatively low uptake of instrumentation/control programs**, identify strategies to increase enrolments and the potential for **partnerships between industry and the VET sector** in the provision of relevant training and infrastructure.

- In 2004-2005, the **Department will consult with industry** to verify electrical//instrumentation training priorities for inclusion in general publicly funded delivery and/or specific initiatives such as the *Competitively Allocated Training* program and the *Skilling WA* program.

Semi-skilled Personnel

Assessment of Existing Capacity

The training system has the capacity to adequately cater for future skilling demand in mobile plant operations, rigging, dogging, scaffolding and general construction. These are areas of traditional strength for the training sector and there is a significant commercial market. Relevant upskilling programs have been included within the Department of Education and Training's *Skilling WA* program in 2003.

Current Publicly Funded Training

- There has been a considerable training investment in the above-mentioned skill areas during 1999 - 2003. As reflected in the table below, approximately **$2 million** worth of publicly funded training programs are provided each year, creating more than **680 training places**.

- Much of this training involves WorkSafe accreditation and there are several private training providers in the market.

Priority Occupations	Peak Demand	Relevant Training Programs	Training Places 1999 - 2003	
			Annual Avg	Total
Semi-skilled Personnel	**2005**			
Mobile plant/crane operators	**140 - 160**	Crane and mobile plant operations	309	1,544
Riggers/doggers	**180 - 210**	Dogging, rigging, scaffolding and general construction programs	372	1,860
Scaffolders	**130 - 185**			
Total Training Places			**681**	**3,404**
Average Annual Training Investment				**$ 2,000,000**

Training Providers

Registered Training Organisations Rigging/Dogging/Scafolding and Mobile Plant Operations	
TAFE	All TAFE Colleges (Numerous Training Packages contain relevant units of competency)
Private Training Providers	Australian Vocational College, Jobs West, Nationwide Transport Training, Transport Forum WA, TWUA

Non-training Supply Strategies

- Some inflow from interstate can be expected.

Potential Pool of Unemployed Persons with Relevant Skills

- At the 2001 Census, 115 scaffolder/riggers and 89 plant/machine operators were recorded as being unemployed in the State.

Action Required

- Upskilling programs for existing workers in **scaffolding, dogging and rigging** will be included within the Department of Education and Training's $1 million *Skilling WA Program* in 2003.

- Any further demand for upskilling related training in these areas, should be catered for on a fee-for-service basis.

Drafting and Design

Assessment of Training Capacity

The training system can accommodate future demand for programs in specialist design/drafting software applications. In recent years, additional resources have been targeted to this area through the Department of Education and Training's Competitively Allocated Training program. This provides a responsive mechanism through which public and private providers can bid for the delivery of training in priority skill areas.

Current Publicly Funded Training

- More than **$1.9 million** is allocated annually for publicly funded drafting/design/engineering programs in Western Australia, creating more than **1,200 training places** each year.

Priority Occupations	Peak Demand	Relevant Training Programs	Training Places 1999 - 2003	
			Annual Avg	Total
Draftspersons/designers	**2003/2004**			
Knowledge of specialist drafting software	**260 - 280**	Drafting and design/engineering	1,267	6,335
Average Annual Training Investment				**$ 1,900,000**

Training Providers

Registered Training Organisations Drafting/Design	
TAFE	Balga, Carlisle Leederville, Fremantle, Perth, remote delivery options
Private Training Providers	ITEC Training and Kinway, AEMS Training, Workplace Australia Group, College of Electrical Training (CET), Progressive Training

Non-training Supply Strategies

- As many of the planned gas processing projects are based on similar plants overseas, it is expected that some of the design and drafting will occur outside of Australia. This will lower the demand for locally based designers/draftspersons.

Potential Pool of Unemployed Persons with Relevant Skills

- At the 2001 Census, there were 185 unemployed Western Australians with design related qualifications.

Action Required

- **Training in specialised drafting/design software packages** will be included within the Department of Education and Training's $1 million *Skilling WA* program in 2003.

- In 2003, the Department will introduce **a new traineeship** which will include training in specialist drafting/design software packages.

- In 2004 and 2005, **the Department will consult with industry** to determine the level of demand for this training and allocate publicly funded training resources accordingly.

Management

Assessment of Existing Capacity

Across the spectrum of public and private training providers, there is significant management training capacity in Western Australia. However, feedback from industry indicates that the quality of publicly funded training provision in areas such as frontline management varies across the State. There is a need for more effective utilisation of the TAFE network in this regard.

Current Publicly Funded Training Provision

- Although not specific to the minerals and processing industries, the VET system has considerable capacity for management and supervisory related training, with in excess of **5,100 training places** provided each year at an estimated worth of **$6 million**.

Priority Occupations	Peak Demand	Relevant Training Programs	Training Places 1999 - 2003	
			Annual Avg	Total
Management	**2004/2005**			
Supervisors/forepersons	**150-170**	Frontline management	416	2,078
Procurement/expediter	**105-130**	General management, logistics,	4,755	23,774
Management (project)	**160**	procurement, quality management,		
Planner/scheduler	**80-85**	purchasing/materials management		
QA/QC/QS inspector	**105-110**			
Total Training Places			**5,170**	**25,852**
Average Annual Training Investment				**$ 6,000,000**

Training Providers

Registered Training Organisations Management	
TAFE	All TAFE Colleges registered to deliver Business Services Training Package
Private Training Providers	APMM Group, Australian College of Project Management, UNE Partnerships, BRWMTS Group, Batchelor Institute of Indigenous Tertiary Education

Non-training Supply Strategies

- The planned gas processing projects are specialised and new to Western Australia. Initially, some key project management personnel are likely to be obtained from the projects' parent overseas companies.

Action Required

- The new **Business Manager** position to be created at Karratha TAFE will ensure that the most relevant management training and expertise is sourced from the WA TAFE network.

- Specific management skills required for the Burrup projects create **opportunities for partnerships with industry**.

Oil, Gas and Petrochemicals Processing

Existing Capacity

The Australian Oil and Gas Industry Training Centre in Subiaco can deliver components of the Chemical, Hydrocarbons and Oil Refining Training Package up to AQF level II and some AQF level III units of competency. Another training delivery site, within an industrial area, is required for the more advanced levels of the Training Package. There is significant scope for partnerships with industry in relation to training resources and infrastructure.

Current Publicly Funded Training

- Approximately **$3 million** is invested annually in processing related training for the minerals, oil and gas sectors – equivalent to about **1,600 training places**.

Priority Occupations	Peak Demand	Relevant Training Programs	Training Places 1999 - 2003	
			Annual Avg	Total
Petrochemical Processin	**2007**			
Control Room/ Process and Field Operators	**200**	Process plant operations	554	2,772
		Minerals processing	1,105	5,527
Process Supervisors	**30**	Workplace training/assessment	416	2,078
Total Training Places			**2,075**	**10,377**
Average Annual Training Investment				**$ 3,100,000**

Training Providers

Registered Training Organisations Minerals/Oil/Gas Processing	
TAFE	Subiaco, Bunbury
Private Training Providers	Workplace Australia Group, CCI Training Services Pty Ltd, J Mackay and Associates, NGT Tasmania, RGIT Montrose *(fire, safety and emergency response)*

Non-training Supply Strategies

- Companies intend to recruit a combination of experienced, intermediate and entry-level operators.

Action Required

- The Department of Education and Training will commission an **independent feasibility study** to assess the viability of a specialised oil, gas and petrochemicals training facility, including the potential for a **Government-industry partnership**.

- The **feasibility study** should examine **a range of training delivery options**, including (1) simulator-based training and (2) computer-assisted and on-line learning.

- In consultation with the Burrup petrochemical companies, the Department will investigate the level of industry demand for a **traineeship in petrochemicals processing**.

- The Department will pursue **collaborative arrangements** between the training and university sectors to support the industries on the Burrup, including: the further development of complementary programs, training pathways and the sharing of facilities/resources.

- The Department will investigate the need for **processing related training support at Karratha TAFE**.

Opportunities for Local Indigenous People

Assessment of Existing Capacity

There is scope to expand employment-based training opportunities on and near the Burrup for local Indigenous people. The successful Indigenous traineeship/apprenticeship programs implemented by Hamersley Iron provide a useful model. These programs include culturally appropriate learning strategies, including mentoring and social support structures. Those completing an initial 12 month traineeship with Hamersley Iron can receive a full year's credit toward a subsequent apprenticeship with the company.

As demonstrated with the Cossack heritage project, Karratha TAFE has the capacity to provide customised, culturally appropriate programs to support the development of Indigenous enterprises.

Current Publicly Funded Training

- In 2002, there were more than **395*** Aboriginal and Torres Strait Islander students participating in training programs at the Pilbara TAFE Minurmaghali Mia (236) and Karratha campuses (159).

- As shown in the table below, these students were enrolled in more than **490* different programs** relevant to the resources sector or with a focus on generic employment skills. These programs were estimated to be worth in excess of **$1.5 million**.

Pilbara TAFE - Karratha and Minurmaghali Mia Campuses		Enrolments 1999 - 2002	
Relevant Occupations/Skills	**Training Programs**	**Annual Avg**	**Total**
Local Indigenous People			
Literacy/numeracy and general employment skills	Special programs and short courses	321 *	1,282 *
Administration	Apprenticeships, traineeships and general construction/industrial skills programs	88 *	350 *
Metals/engineering		36 *	142 *
Mobile plant operations		23 *	93 *
Construction		9 *	36 *
Management		8 *	30 *
Automotive		5 *	19 *
Electrical/electrotechnology		2 *	8 *
Total Training Places		490 *	1,960 *
Average Annual Training Investment			**$1,500,000**

Training Providers

Registered Training Organisations Providing Specialised Programs for Indigenous People	
TAFE	All TAFE Colleges
Private Training Providers	Hamersley Iron Pty Ltd, Bachelor Institute of Indigenous Tertiary Education

Action Required

- The Department of Education and Training will establish an **Aboriginal Employment and Economic Development Officer (AEEDO) position** in Roebourne to liaise with the local Indigenous community and the enterprises on the Burrup to promote employment-based training opportunities during the construction and operations phases of new projects.

*Note: These figures underestimate the total number of Indigenous students and enrolments. While the Minurmaghali Mia campus predominantly has an Indigenous client base, Indigenous students and enrolments are difficult to estimate for the Karratha campus. Within the student database, it is only possible to identify Indigenous students based on information supplied in the enrolment form. Specifically, the response to the question 'Are you of Aboriginal or Torres Strait Islander descent?' In many instances this question is left unanswered.