Process Manufacturing, Recreational Vehicle and Laboratory Industry Reference Committee

MSL Laboratory Operations Training Package

Four Year Work Plan

September 2016

Prepared by

Manufacturing Skills Australia

Contents

Manufacturing Skills Australia acknowledges the financial and other support provided by the Department of Education and Training to support the National Training System.

A. Administrative information

Name of Industry Reference Committee (IRC): **Process Manufacturing, Recreational Vehicles and Laboratory IRC**

Four Year Work Plan prepared by: **Manufacturing Skills Australia**

B. Sector overview

Laboratory operations - snapshot of the industry

Laboratory Operations is not technically a sector, rather it covers a diverse group of technical and scientific occupations located across the whole of industry. The Laboratory Operations Training Package (MSL) addresses the training and recognition needs of samplers, testers and laboratory personnel working in a wide range of enterprises and industry sectors including:

- manufacturing testing
- food and beverage testing
- process manufacturing
- biomedical laboratories
- pathology testing
- defence laboratories
- biotechnology
- construction materials testing
- mineral assay
- environmental testing/monitoring
- scientific glassblowing
- wine making

The most appropriate ANZCO Classifications[1] for this sector are:

Major Class 3 Technicians and Trades Workers

- 311 Agricultural, Medical and Science Technicians
- 312 Building and Engineering Technicians
- 399 Miscellaneous Technicians and Trades Workers

Major Class 2 Professionals

- 234 Natural and Physical Science Professionals

However, these ANZCO classifications do not cover all relevant workers (e.g. scientific glass blowers, samplers and testers).

Other classifications also include people whose work involves testing or monitoring of materials and processes using scientific methods and/or equipment.

In general terms, the occupations covered are those in which non-professional employees use scientific techniques and equipment to carry out tests, and to operate and manage scientific processes. The core of these jobs is the use of scientific techniques, equipment and related knowledge.

Qualifications available in the MSL Training Package

- MSL20116 Certificate II in Sampling and Measurement
- MSL30116 Certificate III in Laboratory Skills
- MSL40116 Certificate IV in Laboratory Techniques
- MSL50116 Diploma of Laboratory Technology
- MSL60116 Advanced Diploma of Laboratory Operations

Business numbers and size

Given the diversity of industries covered by the Laboratory Operations Training Package it is difficult to give an accurate picture of companies. There are many companies whose core business is supported by in-house laboratory facilities, such as Huntsman Corporation Australia which manufactures organic chemicals, plastic foam products and soap and cleaning products. It operates research facilities in Melbourne.[2]

In providing business numbers for this sector the ANZSIC classification – Division M Class 6925 Scientific Testing and Analysis Services was referenced. Companies such as Huntsman Corporation are not likely to be included in this division.

In June 2015, there were 3,164 businesses operating in the scientific testing and analysis services sector.

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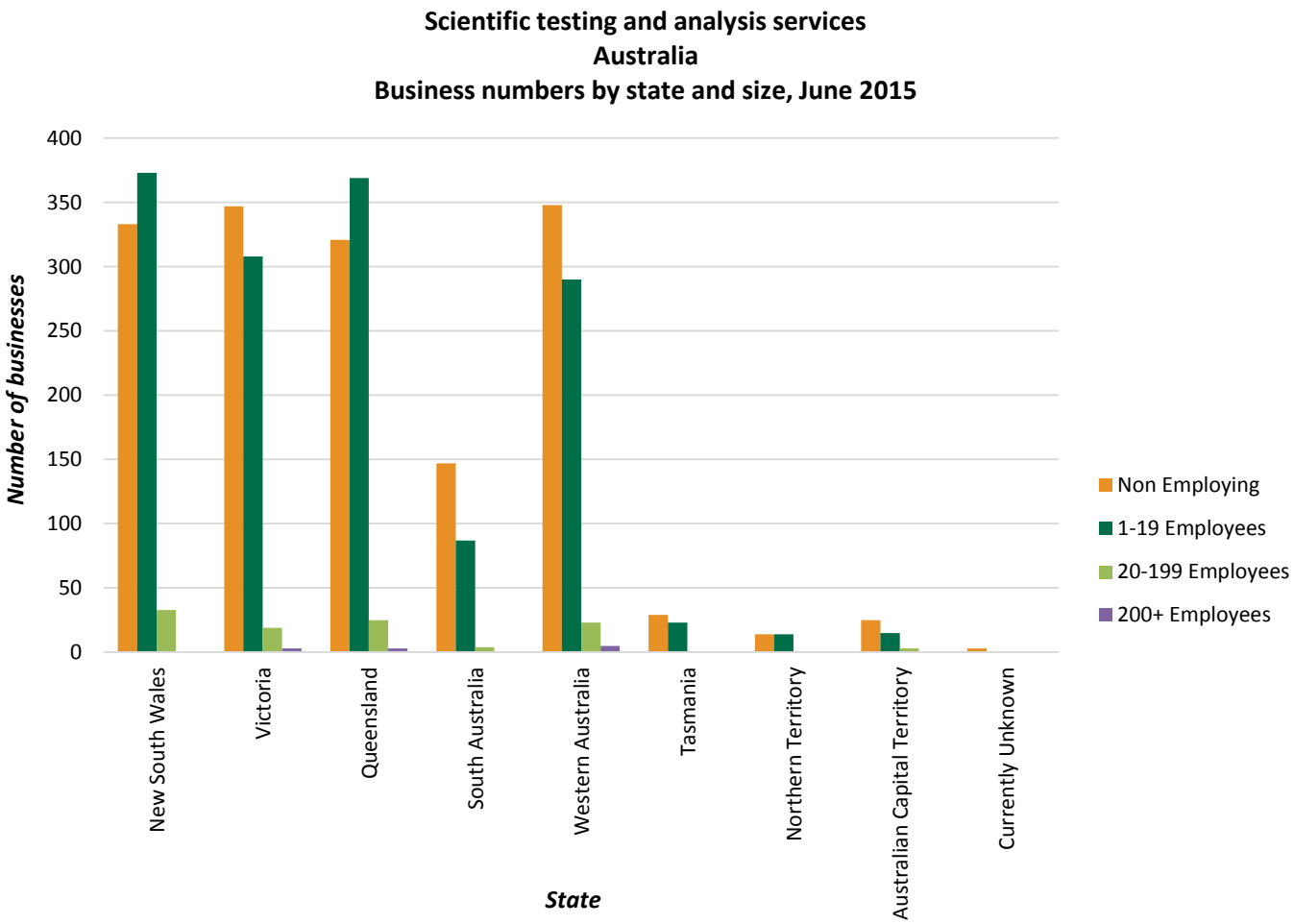
[1] Australian Bureau of Statistics, 2013, *1220.0 - ANZSCO - Australian and New Zealand Standard Classification of Occupations, 2013, Version 1.2*, http://www.abs.gov.au/ANZSCO
[2] IBISWorld, 2015, *Plastic Foam Product Manufacturing in Australia*

96% of businesses were micro and small businesses. 88% of businesses were located in just four states – New South Wales, Victoria, Queensland and Western Australia.[3]



Source: ABS, *Counts of Australian Businesses*, June 2015

***Note**: Businesses have been classified according to the number of employees.*

The Commonwealth government, through the Department of Industry, Innovation and Science, operates the National Measurement Institute (NMI) which is primarily responsible for biological, chemical, legal, physical and trade measurement.[4] State and territory governments may also operate in this area. For example, the Roads and Maritime Services in New South Wales operate a laboratory for road construction materials testing.

There are also several large private organisations providing testing and certification services to a range of industries including the resources industry and the textiles, clothing and footwear industry. These include ALS Ltd, an Australian company providing laboratory testing services for a large range of industries including

[3] Australian Bureau of Statistics, *Counts of Australian Businesses, 2014-15*
[4] IBISWorld, 2015, *Environmental Science Services in Australia*

energy, resources, petrochemical, transportation and infrastructure industries[5], and Intertek which services the textile, footwear, toys, petroleum and chemicals industries.[6]

During industry consultations, stakeholders reported that globally many large and multinational companies are centralising their operations, often in China, and this is leading to the closure of smaller, non-profitable operations in Australia.

Licensing, regulation or industry standards

These occupations are highly regulated as they play a critical role in the safety, quality and compliance of many industry sectors. Standards and/or regulations cover many aspects of laboratory operations, including accreditation of laboratories, testing procedures, use of materials, and documentation and maintenance of equipment.

Regulation of standards relating to use of materials and equipment has driven the need for vocational education and training (VET) in the occupations covered by Laboratory Operations. This is most notable in testing and monitoring of environmental and health hazards in the food processing and rural sectors, as well as testing of product safety in the manufacturing industry.

Another area of demand emerges from the increased attention to quality within the manufacturing and construction sectors. Testing of materials and products is now an inherent part of design and product quality systems. An example of this was a project that MSA's NSW ITAB recently managed in conjunction with the Roads and Maritime Services (RMS) to improve the quality of road materials construction testing in NSW. The project supported standardised skilling for the laboratories servicing RMS.

There are no general licensing issues associated with any units of competency, however, there may be regulatory requirements in some industries and local regulations should be checked for details. Compliance with requirements of workplace quality management systems may also apply in some organisations.

[5] IBISWorld, 2015, *Environmental Science Services in Australia*
[6] Intertek, 2016, http://www.intertek.com/

Challenges and opportunities in the sector/sub-sector at the international/national/jurisdictional or regional level

The following potential challenges and opportunities facing the laboratory operations sector have been identified by stakeholders:

Challenges

- Downturn/transition of the resources sector
- Changes to national and international quality and accreditation standards
- Science, technology, engineering and mathematics (STEM) and Foundation skills, and related continuing professional development
- Language, literacy and numeracy (LLN) skills
- Ongoing development of robotics and automation
- Access to cutting edge technology by education providers
- Ageing laboratory workforce in the Education sector
- Narrowing of laboratory education and employment opportunities in the rural sector
- VET reforms
- Closure of the automotive industry

Opportunities

- Increased Asian market opportunities for Australian agricultural products e.g. dairy
- The National Innovation and Science Agenda (NISA) – driving an increased community and Government support for Science and Science related programs and skills.
- Advanced manufacturing/nanotechnology/advanced materials/additive manufacturing
- Primary and Secondary Science Curriculum
- Compliance/auditing services
- WHS/safety/Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
- Ageing population and increased need for health care
- Growth in the geo-testing sector

The Laboratory Operations Training Package is utilised across many industries as can been seen by the range of challenges and opportunities identified by stakeholders. As such stakeholders are concerned that attracting new entrants to the sector with adequate foundation skills (including LLN) and STEM skills is vital.

The National Innovation and Science Agenda (NISA)[7] with its focus on increasing the STEM skills of Australian students and promoting STEM careers for women is viewed by stakeholders as a significant opportunity for the sector. Together with the release of the National Curricula for Science and Mathematics[8] and the development of a National Curriculum for Technologies[9], the sector is seeing opportunities for growth in the school education sector as well as a potential supply of new entrant workers for the laboratory sector in general. Stakeholders note that the sector may struggle to find new entrants, with both the ageing laboratory assistants in the education sector and lack of current laboratory technicians moving into teaching positions being of concern.

Stakeholders see the recently signed Free Trade Agreements (FTAs) and Trans Pacific Partnership (TPP) as presenting opportunities, especially with the growth in demand for Australian agricultural products such as dairy. They are predicting increasing demand for laboratory services such as food testing to ensure compliance with health and safety standards and quality standards in this industry. As such stakeholders have identified that skills in clean room operations and chemical handling and disposal will be key to maintaining Australia's reputation for 'clean' agricultural products. Compliance and auditing, and the laboratory services that support them, are also considered to be a growth area for the sector with stakeholders identifying an increasing demand both nationally and globally. The introduction of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)[10] is one example of an area of opportunity.

While the sector generally sees more opportunities than challenges, stakeholders identified significant challenges facing the industry both now and in the future. The downturn of the resources sector and the ceasing of automotive manufacturing are viewed as current challenges facing the sector. Minerals mining is one such example, with sites like Olympic Dam in South Australia not going ahead and the subsequent decreased need for laboratory technicians there. A similar situation is developing in the automotive manufacturing sector as the major manufacturers close their operations in Australia. Many of the people currently employed in automotive research and development, including in the research and testing of new materials and products will need reskilling. In areas where there is a decrease in the demand for materials testing (such as the resources and automotive manufacturing sectors), stakeholders are looking to reskill the workforce into growth areas such as geo-testing and laboratory services for the health industry. Geo-testing in the construction and building industry is likely to be a growth area for laboratory technicians, especially considering the May 2016 Budget announcements of increased funding for infrastructure projects. Stakeholders have identified a need for training products to support the development of skills in construction and building materials testing.

Challenges can change from region to region, as evidenced by the resources sector moving from the construction phase to production phase. As more LNG trains come online, there will be an increased demand

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[7] Australian Government, 2016, *National Innovation and Science Agenda* http://www.innovation.gov.au/
[8] Australian Curriculum and Reporting Authority, (n.d.), *Mathematics – Foundation to Year 12*, http://www.acara.edu.au/curriculum_1/learning_areas/mathematics.html
Australian Curriculum and Reporting Authority, (n.d.), *Science – Foundation to Year 12*, http://www.acara.edu.au/curriculum/learning_areas/science.html
[9] Australian Curriculum and Reporting Authority, (n.d.), *Technologies – Foundation to Year 12*, http://www.acara.edu.au/curriculum/learning_areas/technologies.html
[10] Safe Work Australia, (n.d.), *Globally Harmonised System of Classification and Labelling of Chemicals (GHS),* http://www.safeworkaustralia.gov.au/sites/swa/whs-information/hazardous-chemicals/ghs/pages/ghs

for laboratory technicians, with Gladstone in Queensland and Barrow Island in Western Australia predicted to grow. As opportunities for more work arise stakeholders note the ever present challenge of attracting new entrants.

Stakeholders also report a significant decrease in spending on research and development in Australia, particularly in the resources sector. This is partly due to offshoring of testing services to countries such as China as multinational enterprises consolidate their service provision.

Another challenge identified by stakeholders was the narrowing of laboratory education and decline of employment opportunities in the rural sector. This is seen as particularly challenging due to the increasing demand for Australian agricultural products internationally. The delivery of laboratory training in rural and regional areas has been impacted by the ongoing reforms to the VET sector at both national and state and territory level. Funding changes and consolidation of public providers in some states as well as ongoing VET-Fee Help issues are all impacting on laboratory training provision.

For many businesses operating under the National Association of Testing Authorities' (NATA) accreditation, the ongoing updating and development of new standards continues to be a challenge. There is a need to ensure that staff are continually updated on new techniques and standards as well as the skills to meet compliance and auditing requirements.

C. Employment

Employment outlook

Stakeholders report that employment within the sector has decreased as a result of the slowdown in the resources sector. However, they see opportunities opening up in agribusiness and food as a result of the FTAs as Asian nations look to Australia for agricultural and food products. The ageing population within Australia is also expected to drive employment as more health related services will be required. This has resulted in a call by the industry for the inclusion of units around anatomy and genetics in the Training Package.

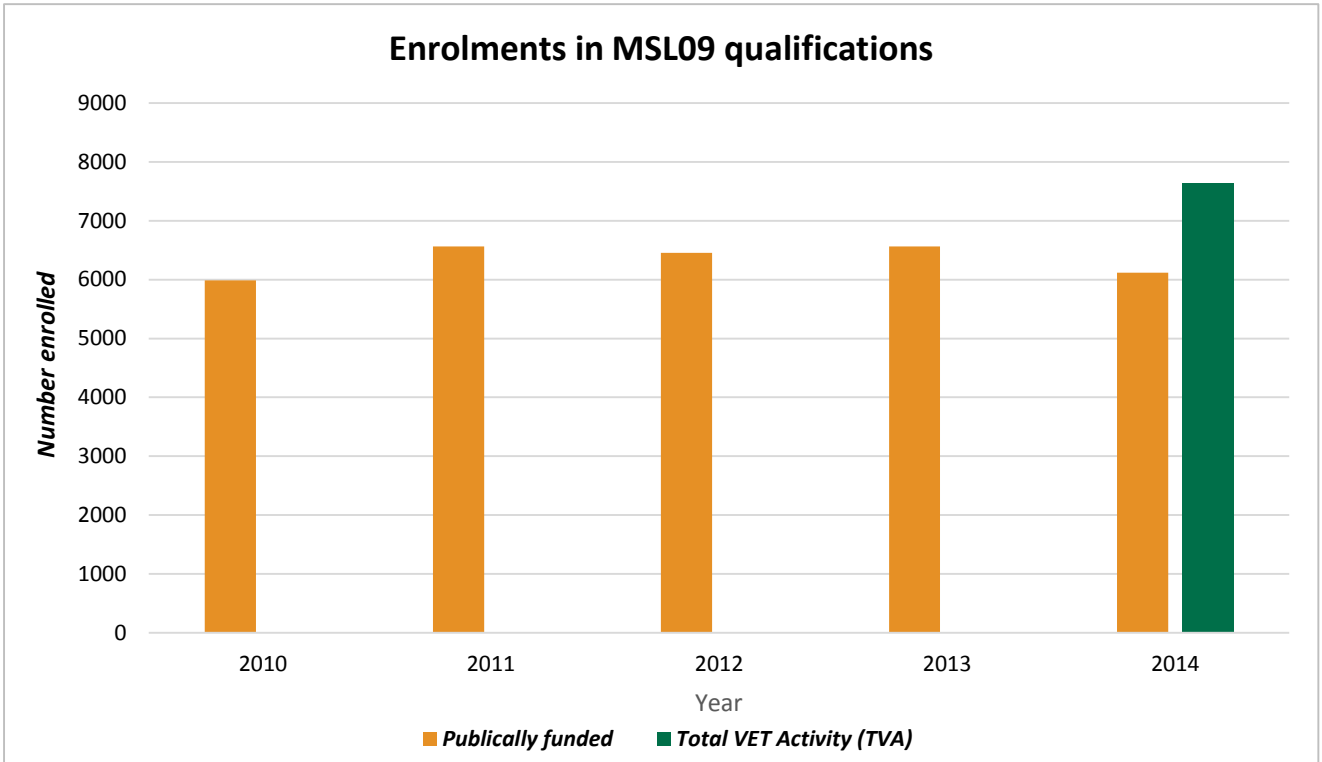
Workforce supply-side challenges and opportunities

Due to an already evident skills shortage, some businesses are cross-skilling their process employees (machine operators) in sample collection and basic laboratory procedures. In addition, there is a need for the laboratory workforce to be multi-skilled, adaptable and able to work across a range of areas within the business. Stakeholders have reported that in order to cross-skill effectively, workers need support in developing the foundation skills required, especially numeracy and calculation skills.

Growth in agriculture and food exports will increase the need for skilled laboratory technicians, particularly in rural areas. Stakeholders are concerned that there will be a lack of supply of skilled workers available to meet these needs due to a lack of training opportunities. Increasingly employers in rural areas are looking for workers with good communication and problem solving skills as many are small business operators who need workers to be able to liaise directly with customers. Stakeholders have also expressed concern that learners do not have the appropriate STEM and foundation skills required to complete the training.

Access to appropriate equipment during training has also been identified as a challenge. Most laboratory equipment is expensive and beyond the financial means of most registered training organisations (RTOs), including the public provider.

Despite stakeholder feedback about employment levels there has been a steady increase in enrolments in qualifications from the MSL Training Package. In 2010 there were 5,988 enrolments in publicly funded institutions and by 2014 this had increased to 6,120. While this doesn't seem to be a substantial increase over five years, this becomes more evident with the introduction of Total Vet Activity (TVA) data collection. There were an additional 1,513 enrolments in fee for service institutions showing an overall total of 7,633 in 2014.



Source: NCVER VOCSTATS, Program enrolments 2003-2014, accessed April 2016

There is good coverage across all qualifications in this Training Package. A range of RTOs (65 in total) deliver the MSL Training Package, the majority being publicly funded. Of the school based RTOs (19), all are based in Queensland and only have Certificate II in Sampling and Measurement on scope.

Another factor which may impact delivery of qualifications in this sector is the restructure and amalgamation of the TAFE providers in Western Australia[11]. It may be further impacted by the proposed changes to TAFE NSW as it moves from 10 institutes to five regions[12]. These changes may lead less course offerings and make it more difficult for the industry to access training.

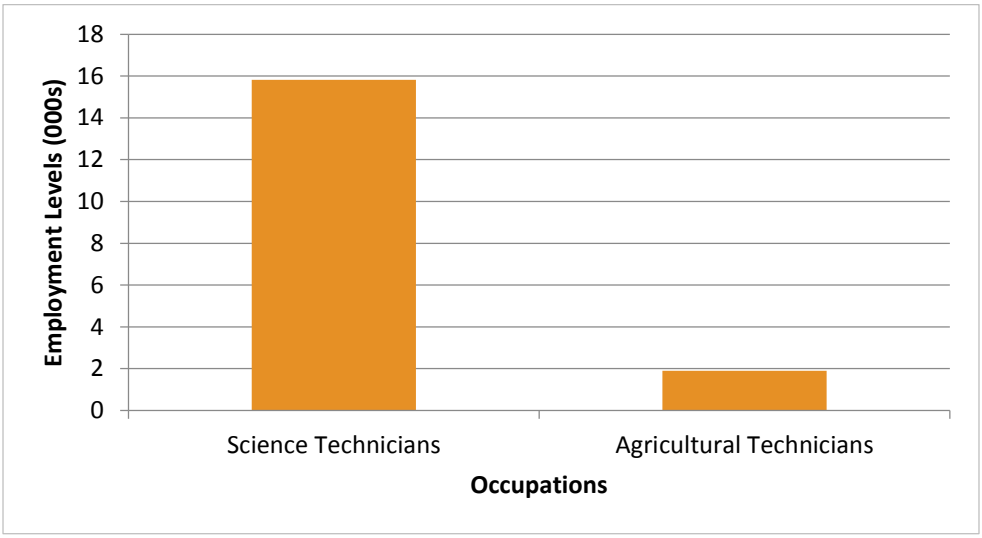
Note: Completion data has not been included as initial analysis of the data shows very low completion rates. This may be skewed by the fact that the enrolment in the public system is set up to capture only full qualification enrolments, even if the participant only intends to do a Unit of Competency or a Skill Set. The introduction of the Unique Student Identifier (USI) may provide data that will permit better identification on cohort outcomes and student pathways.

[11] Department of Training and Workforce Development, 2016, *Changes to TAFE in Western Australia*, http://www.dtwd.wa.gov.au/trainingproviders/training-sector-reform-project/Pages/changes-TAFE-WA.aspx
[12] TAFE NSW, 2016, *Generational change for TAFE NSW*, media release, 13 July https://www.tafensw.edu.au/media-centre/2016/july/generational-change-for-tafe-nsw?meta_C_or=press%20release&rel=press%20release

Additional information

The following graphs have been supplied by the Department of Education and Training. The Department has sourced national occupation-related data from the Department of Employment and the Australian Bureau of Statistics to inform the work of the IRCs.

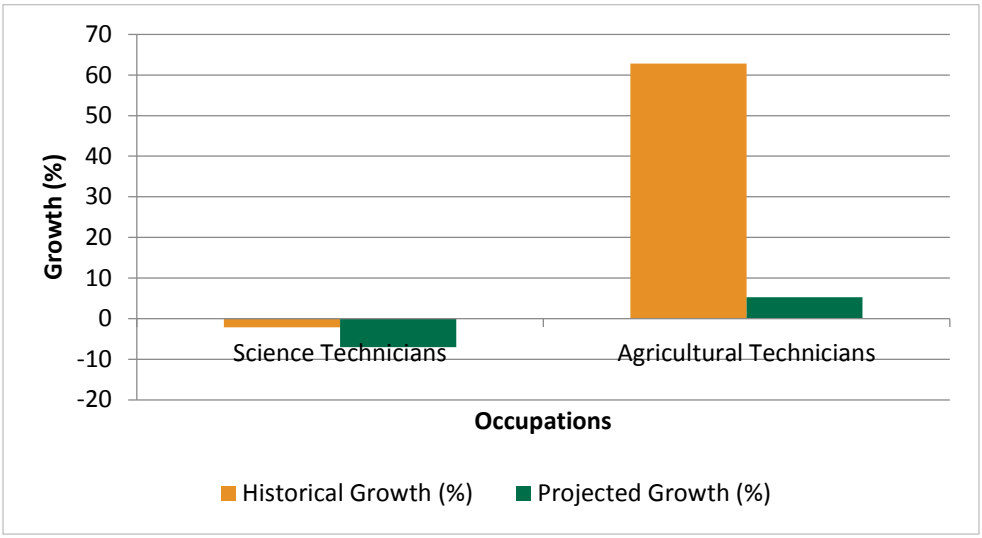
Key Occupations – Employment Levels (000s)[13]



Source: Australian Bureau of Statistics (ABS)

[13] Note: Occupations are at the four digit ANZSCO code. Employment levels are the five year annual average to 2015. Figures include all employed in the occupation across the economy, not just the relevant industry.

Key Occupations – Historical and Projected Employment Growth (%)[14]



Source: Historical employment growth from the Australian Bureau of Statistics (ABS) and projected employment growth from the Department of Employment.

IRC analysis

Data provided in the graphs above represent two Key Occupations as determined by the Department of Employment. These occupations are a very small selection of occupational outcomes from the MSL Training Package. The following table provided by MSA to the IRC uses Occupational Projections made by the Department of Employment. It more accurately reflects the Key Occupational outcomes of training identified by stakeholders for qualifications from the MSL Training Package.

The first graph above, showing a five year annual average, does not give much scope for comment. Without seeing year on year changes, it can be difficult to comment on industry and economic influences that may cause fluctuations in employment.

[14] Note: Occupations are at the four digit ANZSCO code. The historical employment is the five year growth rate to 2015 and the projected employment growth rate is the expected growth rate to 2019. Rates are based on figures that include all employed in the occupation across the economy, not just the relevant industry.

Employment projections for occupations relevant to the MSL Training Package[15]

Occupation Code	Occupation	Employment level - November 2015 ('000)	Department of Employment Projections		
			Projected employment level - November 2020 ('000)	Projected employment growth - five years to November 2020	
				('000)	(%)
1399	Other Specialist Managers	49.5	61.1	11.6	23.5
2342	Chemists, and Food and Wine Scientists	7.8	7.5	-0.3	-4.0
2343	Environmental Scientists	18.7	19.3	0.6	3.0
2349	Other Natural and Physical Science Professionals	8.6	8.3	-0.3	-3.1
3111	Agricultural Technicians	2.0	2.1	0.1	3.7
3114	Science Technicians	16.1	16.4	0.3	1.8

Source: Department of Employment.

Laboratory Managers (code 139913) sit within the occupational group 1399 and the projected employment growth shown in the table above concurs with stakeholder feedback. Laboratory Managers work across a wide variety of sectors, and the growth of agriculture and food exports will increase the need for skilled laboratory technicians and managers. Western Australia have reported an increased need for Laboratory Managers in that jurisdiction. This drive will be across industry groups as the resources industry shifts from construction into operations, as higher skills will be required in more automated laboratories, and the demands of an ageing workforce increase need for new recruits.[16]

[15] Department of Employment, 2016 *Employment Projections. Occupation projections*. http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections

[16] Resources Industry Training Council, 2015. *Industry Workforce Development Plan – Downstream Process Manufacturing*. http://www.ritcwa.com.au/#!iwdp-new/c1nmi

D. Skills outlook

International and national trends

Internationally, job design is being affected by multinational businesses centralising operations. Australia will have to compete with global companies who have the latest technologies, processes and a wide variety of services available.

In Australia, automation and robotics are driving the need for laboratory technicians to have not only technical skills to operate equipment but also to maintain and repair equipment. The sector expects that workers are going to require skills to respond to additive manufacturing processes, nanotechnology, laser cutting and related software. Nano and micro-technologies will drive skill development in areas such 'lab-on-a-chip' development and manufacturing and similar microfluidic and photo-optic devices. Such technologies will also impact the level of demand for laboratory testing staff, when samples often can the tested onsite in real time and by comparatively low level trained collectors.

The five most important skills for the sector's workforce within the next three to five years.

Rank	Skill	How identified
1	Sampling and testing	Industry consultations
2	Customer service	Industry consultations
3	Numeracy / mathematics	Industry consultations
4	Materials knowledge	Industry consultations
5	Communications	Industry consultations

Generic workforce skills

Ranked from 1 being the most important, to 12 being the least important.

1	STEM
2	Technology
3	Customer service / Marketing
4	Data analysis
5	Communication / Virtual collaboration / Social intelligence
6	Learning agility / Information literacy / Intellectual autonomy and self-management
7	Design mindset / Thinking critically / System thinking / Solving problems
8	LLN
9	Environmental and Sustainability
10	Managerial / Leadership
11	Financial
12	Entrepreneurial

E. Other relevant skills-related insights for this sector

Concern has been expressed for the potential loss of skills in the education sector due to the ageing workforce. There has been little support within the school education system for careers in the laboratory field. Stakeholders believe that more can be done to nurture future laboratory workers through exposure to all areas of the sector.

F. Training Product Review Plan – 2016-17 – 2019-20

Stakeholders identified a range of training product items that need to be considered in the Training Product Review Plan.

Items identified as time critical and included in the priorities for 2016-17:

- Development of instrumentation Units of Competency
- Units of Competency in histotechnology
- Units of Competency for use, maintenance and repair of robotics as well as for automation

Items identified for the 2017-2020 plan:

Undertake an evaluation of the Training Package to ensure outcomes meet the following skill needs:

Technical skills

Investigate the need to develop training products for:

- skills to support testing of building materials in the building and construction sector
- skill sets for specialised industry sectors e.g. instrumental analysis, compliance in the laboratory
- skills in clean room operations
- skills in chemical handling and disposal
- knowledge skills in anatomy and genetics for pathology

Investigate the use of and skills required in:

- micro photo-optics in the industry
- safe laser cutting operations
- auto CAD and related software applications
- polymeric bio-compatible materials selection and treatment
- use, design and testing of microfluidic devices

Investigate the need for specific units for microfluidic quality testing

The need to retain MSL20109 was also identified by stakeholders. Many commented on the importance of the pathway created by this qualification, from school based training directly into industry. This is especially seen in regional areas, where employers and school RTOs have excellent working relationships and appreciate the training delivered via the VET in School (VETiS) programs.

Generic skills

- communication skills
- numeracy
- calculations for laboratory operations
- innovative solutions to problems using technical knowledge
- project management
- innovative and critical thinking

G. IRC Signoff

This work plan was agreed as the result of a properly constituted IRC decision and was approved by the Chair

Samantha Read on 22 September 2016

IRC Training Product Review Plan 2016-17 – 2019-2020

Contact details: Samantha Read, Chair

Date submitted to Department of Education and Training: 22 September 2016

Planned review start (Year)	Training Package code	Training Package name	Qualification code	Qualification name	Unit of Competency code	Unit of Competency name
IRC to recommend the most appropriate financial year in which to review the training product. E.g. 2016-2017	Note: The Department will pre-populate these fields		IRCs to complete only if they propose to review different qualifications or units of competency of a training package at different stages			
2017 - 2020			Undertake an evaluation of the Training Package to ensure outcomes meet the following skill needs: *Technical skills* Investigate the need to develop training products for: • skills to support testing of building materials in the building and construction sector • skill sets for specialised industry sectors e.g. instrumental analysis, compliance in the laboratory • skills in clean room operations • skills in chemical handling and disposal • knowledge skills in anatomy and genetics for pathology Investigate the use of and skills required in: • micro photo-optics in the industry • safe laser cutting operations • auto CAD and related software applications • polymeric bio-compatible materials selection and treatment • use, design and testing of microfluidic devices Investigate the need for specific units for microfluidic quality testing			

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2017 - 2020			*Generic skills* • communication skills • numeracy • calculations for laboratory operations • innovative solutions to problems using technical knowledge • project management • innovative and critical thinking