Australian Government

Department of Education, Employment and Workplace Relations

MSL975012A Provide input to production trials

Revision Number: 1

MSL975012A Provide input to production trials

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to work closely with production personnel to conduct a routine trial to adjust formulations or develop products and processes following preliminary laboratory work. The unit covers monitoring critical process parameters, collecting and testing of samples and analysing results. The unit does not cover the planning and management of the trial, development of product briefs or the troubleshooting of equipment and production processes.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians and technical officers working in the manufacturing, biotechnology, construction materials, pharmaceutical and food processing industry sectors. All operations must comply with relevant standards, appropriate procedures and/or enterprise requirements. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
	MSL974003A	*Perform chemical tests and procedures*
		OR
	MSL974004A	*Perform food tests*
		OR
	MSL974005A	*Perform physical tests*
		OR
	MSL974010A	*Perform mechanical tests*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for the trial	1.1. Clarify trial objectives, specifications, documentation and reporting requirements 1.2. Identify the environmental, health, safety, and /or food safety hazards associated with the trial and the recommended control procedures 1.3. Determine the availability of resources and the need for any clearances, special safety and storage requirements 1.4. Review the recommended trial schedule to identify potential barriers/constraints and develop alternatives as necessary 1.5. Communicate and confirm all laboratory requirements with plant operators and personnel in related work areas and functions
2. Participate in the trial	2.1. Reconfirm trial details with all relevant personnel 2.2. Identify any last minute changes and delays and make appropriate adjustments 2.3. Liaise closely with production personnel to conduct the trial safely and efficiently 2.4. Collect required product samples for laboratory analysis and/or reference 2.5. Monitor critical process parameters and record required data 2.6. Monitor data to identify problems, significant process variations and/or unacceptable product 2.7. Recommend changes to production processes as required 2.8. Leave plant in condition suitable for routine production to recommence
3. Assess and report trial outcomes	3.1. Arrange for, or conduct, testing of product samples to check specifications 3.2. Analyse test results and relate properties of product samples to formulation details and processing methods 3.3. Identify and investigate out of specification or unacceptable outcomes, as required 3.4. Recommend possible modifications and/or opportunities for improvements within limits of role and responsibility 3.5. Document and report trial outcomes in accordance

ELEMENT	PERFORMANCE CRITERIA
	with enterprise procedures
4. Maintain a safe work environment	4.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other personnel 4.2. Minimise the generation of wastes and environmental impacts 4.3. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 4.4. Care for and store equipment and reagents as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- analysing trial objectives and specifications to accurately determine resource requirements
- liaising with relevant personnel to ensure trials are organised and conducted efficiently
- following safety requirements
- working within production constraints, priorities and pressures
- communicating effectively with personnel
- collecting accurate trial data and samples in the time available
- recognising, interpreting and reporting problems, atypical situations or unacceptable products
- recommending product modifications and improvements
- reporting trial outcomes in accordance with enterprise procedures

Required knowledge

Required knowledge includes:

- trial objectives, laboratory trial requirements, documentation and reporting requirements
- recipes/formulations, technical specifications and quality parameters for trial products
- effect on product properties of variations in recipes/formulations
- product properties, process stages and unit operations involved in the trial
- relationship between temperature and viscosity
- friction, pumping and fluid flow
- expected nature/condition of materials at each process stage
- causes and remedies for common processing problems associated with trial products
- sampling and test methods for trial products
- occupational health and safety (OHS), food safety and /or environmental management procedures relevant to trial

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • analyse trial objectives and specifications to accurately determine resource requirements • liaise with relevant personnel to ensure trials are organised and conducted efficiently • follow all safety requirements on the production floor • work within production constraints, priorities and pressures • communicate effectively with personnel • collect accurate trial data and samples in the time available • recognise, interpret and report problems, atypical situations or unacceptable products • recommend product modifications and improvements within scope of responsibility • report trial outcomes in accordance with enterprise procedures.

Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment.
	This unit of competency may be assessed with:
	• *MSL924001A Process and interpret data*
	• *relevant MSL974000 series units of competency*
	• *relevant MSL975000 series units of competency*.
	Resources may include:
	• access to operating plant or pilot plant for duration of trials
	• trials, sampling and testing enterprise procedures for:
	  • sampling containers and sampling equipment
	  • test equipment, laboratory instruments and reagents.

Method of assessment	The following assessment methods are suggested: • review of trial documentation completed by

EVIDENCE GUIDE	
	candidate to ensure quality and timeliness • feedback from personnel involved in trials, supervisors • observation of candidate participating in production trials • oral or written questioning to check underpinning knowledge of trial procedures, sampling and test methods, common causes and remedies for product/processing problems. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** A new manufacturing plant has been constructed to produce titanium dioxide ($TiO_{2)}$ for use in food and paint manufacture. An experienced laboratory technician is involved in the plant's commissioning process which has been designed by plant engineers. The commissioning involves trial operation of each section of the plant to achieve intermediate products, such as titanium tetra-chloride ($TiCl_4$) of acceptable quality for use in subsequent stages. The technician provides input to the trials by collecting and testing samples, analysing the results and providing regular reports to the engineers. The importance of the technician's work cannot be overestimated. They have to work under tight time deadlines, quality requirements and the overall pressure

EVIDENCE GUIDE	
	of commissioning the plant on time and within budget. **Food processing** The laboratory is notified of an upcoming trial for sour cream using a new starter culture. A technician is assigned to perform the laboratory assessment of the trial. The technician discusses with the production supervisor about when the cream will be cultured. It is agreed that the technician will monitor the fermentation, collect samples, and coordinate testing of the final product. The technician obtains protective footwear and hearing protection to wear while in the production area. On the day of the trial the technician calibrates the process pH meter and monitors the pH of the vat as fermentation progresses. Once the desired pH is reached, the technician advises the production team to commence packing of the product. After collecting samples of the final product from the start, middle and end of packing, the technician records the sample details and distributes the sample for both internal and external laboratory testing. Final product results are collated by the technician, who reports any out of specification results to the quality and production departments.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• Australia New Zealand Food Authority (ANZFA) Code and User Guides
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• equipment startup, operation and shutdown procedures
	• material safety data sheets (MSDS)
	• material, production and product specifications
	• principles of good laboratory practice (GLP)
	• production and laboratory schedules
	• quality, equipment and procedures manuals
	• standard operating procedures (SOPs)
	• Therapeutic Goods Regulations 1009

Product properties, **process stages and unit operations involved in the trial**	Product properties, process stages and unit operations involved in the trial may include: • classification of samples (screening and sieving)

RANGE STATEMENT	
	• milling • mixing • separation (distillation, sieves, filtration, solvent extraction and chromatography) • drying • concentrating • diluting • depositing (injecting, forming and extrusion) • retorting • cooling, freezing, refrigeration and heat transfer • closure (vacuum sealing) • weighing and packaging • materials handling and transport • warehousing
Trial specifications	Trial specifications may include: • product specifications • recipe/formulations • processing parameters • trial size, production target and timeline • trial schedule and resources required • required product samples and tests • analysis of relevant OHS, food safety and environmental hazards and controls • storage requirements
Hazards	Hazards may include: • electric shock • microbiological organisms and agents associated with soil, air and water • solar radiation, dust and noise • chemicals, such as acids, heavy metals, pesticides and hydrocarbons • aerosols from broken centrifuge tubes and pipetting • radiation, such as gamma and X-ray • sharps, broken glassware and hand tools • flammable liquids and gases • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam and industrial gases

RANGE STATEMENT	
	• sources of ignition • disturbance or interruption of services • manual handling, working at heights and working in confined spaces • crushing, entanglement and cuts associated with moving machinery or falling objects • pedestrian and vehicular traffic
Safety procedures and hazard control measures	Safety procedures and hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples, reagents, aliquoted samples and hazardous materials • handling and storage of hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning and decontaminating equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as hard hats, hearing protection, gloves, safety glasses, coveralls, gowns, body suits, respirators and safety boots • machinery guards • signage, barriers, flashing lights and traffic control • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Resources	Resources may include: • operators and personnel from affected work areas and functions • production, testing and sampling equipment • enterprise procedures and standard methods for sampling and testing • raw materials/ingredients, packaging components and consumables

RANGE STATEMENT	
	• trial documentation, such as technical specifications, plant or production line layout, MSDS, trial request and result forms
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		