



Australian Government

Department of Education, Employment and Workplace Relations

SFIAQUA510B Select, plan or design a system or facility utilising high technology water treatment components

Release: 1

SFIAQUA510B Select, plan or design a system or facility utilising high technology water treatment components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency involves the knowledge, processes and techniques necessary to select, plan or design a system or facility using high technology water treatment components. Licensing, legislative, regulatory or certification requirements may apply to this unit. Therefore it will be necessary to check with the relevant state or territory regulators for current licensing, legislative or regulatory requirements before undertaking this unit.
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Application of the Unit

Application of the unit	This unit addresses the selection, planning or design of a system or facility using high technology water treatment components, such as biological, mechanical/physical/solid and chemical filters. It covers the modification of plans or designs to suit changing circumstances. Activities involving construction or installation of systems or facility, and fish husbandry and handling are covered by other aquaculture, seafood processing and seafood sales and distribution units of competency. These components can be applied within an aquaculture or holding facility in the seafood industry, or an aquascape or holding tank in the ornamental or pet sector. The unit includes the development of work procedures and other techniques to select and use these components. Processes will ensure the ability to recognise when external expertise is needed, and access specialists, technicians and tradespeople as required. The unit will be relevant to those supervisors or managers who have responsibility for a specific facility or who lead a site work group or team. All enterprise or workplace procedures and activities are carried out according to relevant government regulations, licensing and other compliance requirements, including occupational health and safety (OHS) guidelines and ecologically sustainable development (ESD) principles. Equipment operation, maintenance, repairs and calibrations are undertaken in a safe manner that conforms to manufacturer instructions. Appropriate personal protective equipment (PPE) is selected, checked, used and maintained.
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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
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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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine the system or facility requirements	1.1. Specific water quality and environmental parameters required by the cultured or held stock are defined, including final product and market characteristics. 1.2. Types of high technology water treatment components of a recirculating aquaculture system (RAS) that would provide the appropriate environment for cultured or held stock are identified. 1.3. The optimum number and sizes of the culture or holding systems required to achieve stocking are determined and harvest objectives that are within the calculated operational budget are set. 1.4. Mechanisation or automation of process or activity, including the use of specialised contract services, is researched and introduced. 1.5. Information sources are checked for relevant information, advice and guidelines.
2. Define system or facility inputs and outputs	2.1. Design or upgrade specifications and decisions are documented and relevant information communicated clearly through plans, specifications, procedure manuals and records or reports. 2.2. Work plans or schedules are drawn up in consultation with senior personnel, taking budgeting, planning and operational requirements into consideration. 2.3. Culture or holding structures or systems are designed, located and orientated to conserve natural resources, including water and energy. 2.4. Design output is verified against enterprise objectives by a competent designer or specialist. 2.5. A construction plan is developed according to accepted design principles, enterprise requirements and commissioning or start-up work procedures. 2.6. Own and work team's knowledge and skills are evaluated against the construction plan and work schedules, and the requirement for external expertise or assistance is determined and obtained, where appropriate.
3. Determine capital expense budget	3.1. Materials, resource and supply provision requirements, including contingency options, are determined and documented from work plans, schedules and design or upgrade specifications. 3.2. Labour requirements are estimated based upon

ELEMENT	PERFORMANCE CRITERIA
	documented work plans or schedules, and allowances are provided for variances that may occur. 3.3. External labour and hire equipment contracts are negotiated and confirmed with management. 3.4. Costing attributed to each component is based upon quoted information from suppliers. 3.5. Contingencies for problems with supply of materials, equipment and services are included in budget.
4. Determine operating expense budget	4.1. Operating expense budget is determined, indicating all input and output expenses applicable to the proposed system or facility, including commissioning or start-up costs. 4.2. A break-even analysis and a sensitivity analysis of effects of changes in input and output costs are included in budget, which also identifies critical economic inputs or costs. 4.3. Contingencies for low or lost production are included in budget.
5. Select, plan or design system or facility	5.1. Individual components are selected, planned or designed to provide optimal conditions for the cultured or held stock. 5.2. Combined components that provide reliable, functional, serviceable and flexible systems for the intended production inputs and other culture or holding activities are selected. 5.3. Construction and commissioning or start-up specifications are developed that define tasks necessary to achieve the required uniformity and efficiency of culture or holding operations according to industry standards.
6. Review and finalise system or facility design and budgets	6.1. Work plans or schedules, design specifications, construction plan or commissioning or start-up procedure are reviewed and revised to meet changing circumstances. 6.2. Budgets for capital and operating expenses are reviewed and revised to meet changing circumstances. 6.3. Relationship between capital and operating costs is examined, including a review of alternative water and energy sources. 6.4. Work plans or schedules, design specifications and system or facility inputs/outputs are benchmarked against appropriate existing operations. 6.5. Overall operation and output of the proposed system or facility is reviewed to ensure that it meets the

ELEMENT	PERFORMANCE CRITERIA
	long-term directions and purposes of the business and is economically sustainable.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- analysing problems, devising solutions and reflecting on approaches taken
- communicating with external stakeholder groups, such as government, local community and industry
- compiling and analysing data
- considering depreciation and replacement of components
- engaging consultants and external advisers, and using their expertise
- forward planning and applying risk management, safeguards and contingency management
- maintaining operational and financial records
- managing waste and its removal, and addressing downstream aspects to prevent environmental impacts
- modifying equipment and components
- negotiating with contractors, consultants and stakeholder groups as well as government representatives
- piloting scale trails, scaling up and responding to problems associated with changing systems
- producing technical specifications, drawings or plans
- responding to peer review of plans and layout or design of RAS, aquascapes (ornamental industry) and holding operations
- selecting mechanical and electrical systems, processor control panels and other electronic equipment, monitoring and alarm systems
- selecting suitable site and using its surrounding infrastructure (e.g. water sources)
- selecting, planning or designing systems or facilities using high technology water treatment components
- undertaking budgeting
- undertaking research.

Literacy skills used for:

- interpreting aquaculture engineering publications, technical literature and design specifications

REQUIRED SKILLS AND KNOWLEDGE

- interpreting documentation relating to water and energy efficiency requirements, including environmental and biological requirements of the cultured or held stock
- reading and interpreting work plans, business plans, specifications and drawings, equipment operation manuals and contracts
- researching and analysing data
- writing reports, records and procedures.

Numeracy skills used for:

- applying formulae to determine flows, pump efficiency, dissolved oxygen and water requirements, and volumes and quantities of inputs and outputs of liquids, gases and solids
- calculating number and size of culture or holding systems to meet production objectives
- determining and reviewing capital and operating budgets
- maintaining records and data.

Required knowledge

- analysis and adoption of best practice management
- automatic control and monitoring systems
- calculation and analysis of key performance indicators (KPIs) and their interpretation
- causes of heat loss or gain
- comparisons of component capabilities and prices
- contract development and management, and engagement of contractors and consultants
- effective management of staff, time and resources
- federal, state, territory and local government laws and regulations relating to:
 - animal ethics and welfare
 - environmental sustainability, particularly strategies and regulations/licence conditions for waste and effluent minimisation and methods of disposal
 - food safety and withholding periods when using chemicals or medications
 - OHS for staff, management, contractors and visitors, including the use of PPE
 - translocation of exotic or introduced species and biosecurity issues
 - use and control of hazardous substances
- impacts of inputs on systems and component operation, such as maximum stocking, feeding and waste loads
- importance of optimised production to achieve sound economic outcomes
- insulation and temperature control in an indoor facility, including air flows and ventilation (e.g. condensation, carbon dioxide and ozone)

REQUIRED SKILLS AND KNOWLEDGE

- methods of customisation and retrofitting of components
- market demand and the influence of supply and demand on the prices of inputs and outputs
- opportunities for cost reductions, particularly with capital, but also ongoing, operating costs
- project and budget management
- purchase of off-the-shelf items or improvising with existing items
- risk identification, assessment and mitigation or management
- site plans, specifications and working drawings
- standards, manufacturer guidelines and approaches to the selection, design and start-up of systems and facilities containing high technology water treatment components, such as:
 - adverse effects on economics from holding stock over after it has reached market size
 - animal health and disease diagnosis
 - aquatic engineering principles, hydrology and water dynamics
 - association between water hydraulics, water chemistry and aeration or oxygenation, supersaturation and gas exchange
 - biology of stock and environmental and husbandry requirements within RAS to achieve growth targets
 - commissioning or start-up of new or upgraded systems or facilities
 - fish physiology, breeding and life cycles in recirculation systems, including the impact and management of stress on cultured or held stock
 - forward planning and risk management for events, such as blackouts, brownouts and equipment breakdowns
 - mechanical and technical aspects of recirculation systems, including energy use, mass balance, water hydraulics and flow, and pumps and pipe work
 - monitoring of basic and advanced environmental and water quality parameters
 - nitrification and other microbiological process and requirements, including biofilter start-up, shock-loading and maintenance
 - operation and maintenance of water treatment components, including back-flushing filters, cleaning (pigging) of water supply and disposal lines, and routine dry-outs
 - optimal and critical levels for water quality parameters, such as temperature, pH (acid/alkaline balance), dissolved oxygen, nitrogenous wastes and carbon dioxide
 - options for the selection or use of high technology water treatment components
 - relationships between inputs and outputs of recirculation systems, particularly biomass, size classes and quantity of feed
 - researching and introduction of mechanisation or automation of process or activity, including the use of specialised contract services

REQUIRED SKILLS AND KNOWLEDGE
• species environmental and water quality requirements • species selection and end product definition and characteristics • system and facility design, including appropriate sizing of operation • use of KPIs for benchmarking within the system and against other systems or facilities • uses for wastes, recycled water and by-products • waste management, effluent treatments and other by-product uses (e.g. hydroponics and fertilisers) and environmental issues.

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 evidence required to demonstrate competence in this unit	Assessment must confirm ability to • select, plan or design of a system or facility using high technology water treatment components and ensure that the proposed system or facility complies with legislative requirements • benchmark proposed system against existing systems. Assessment must confirm knowledge of: • standards, manufacturer guidelines and approaches to the selection, design and start-up of systems and facilities containing high technology water treatment components.
Context of and specific resources for assessment	Assessment is to be conducted at the workplace or in a simulated work environment. It should involve planning or design of a RAS typically used in aquaculture, holding or ornamental facilities in the region. Resources may include: • workplace documentation and personnel • relevant legislation, standards and guidelines.
Method of assessment	The following assessment methods are suggested: • journal explaining: • analysis of decisions against other appropriate operations • participation in sustainable work practices and processes • the methods used to select equipment, devices and components and review their size and capabilities • portfolio of: • work plans, schedules, drawings and scale models • budgets, order forms and invoices • materials lists and contracts of service

EVIDENCE GUIDE

	• documentation demonstrating the development and implementation of work procedures • project (work or scenario based) • report on the impact of the selected or designed system or facility on stock, labour, OHS, cost reduction and efficiency • work diary, photographs or videos.
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EVIDENCE GUIDE

Guidance information for assessment	This unit may be assessed holistically with other units within a qualification.
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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.	
<i>Relevant government regulations, licensing and other compliance requirements</i> may include:	• business or workplace operations, policies and practices: • commercial law, including fair trading and trade practices • consumer law • corporate law, including registration, licensing and financial reporting • disability policies and practices • equal opportunity, anti-discrimination and sexual harassment • industrial relations and awards, individual employment contracts and share of catch agreements • jurisdictional variations • superannuation • taxation • trade practices • warnings and dismissals • worker's compensation • ESD principles, environmental hazard identification, risk assessment and control • fisheries or aquaculture regulations, permits, licences, quotas, catch restrictions and other compliance requirements, including: • Australian Exclusive Economic Zone • international treaties and agreements

RANGE STATEMENT

	• food safety, Hazard Analysis Critical Control Point (HACCP), hygiene and temperature control along chain of custody • imports quarantine and inspection, and importing approved arrangements for Australian Quarantine Inspection Service (AQIS), Australian Customs Service (ACS) and Biosecurity Australia (BA) • Indigenous native title, land claims and cultural activities, including fishing by traditional methods • maritime and occupational diving operations: • foreign and Australian legislation applying to quarantine and customs • International Convention for the Safety of Life at Sea (SOLAS) • International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 1978) • Marine Emergency Response Search and Rescue (MERSAR) • National Standards for Commercial Vessels • pollution prevention - International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) • Uniform Shipping Laws (USL) Code • use of vessels, right of way and other marine orders, bunkering and refuelling • land, buildings and vehicles: • buildings and structures design and appearance, constructions and additions • poaching, trespass and theft • road laws for use of motor vehicles, bikes, trucks and other transport equipment • soil and water management • use of chemicals and biological agents • use of firearms and powerheads • use of utilities, including water, natural gas, electricity and sewage • water or land lease, tenure or ownership and use • OHS hazard identification, risk assessment and
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RANGE STATEMENT	
	control • product quality assurance: • correct naming and labelling (e.g. country of origin, Australian Fish Names Standard and eco-labelling) • correct quantities, sizes and other customer requirements • third-party certification (e.g. Australian Grown and ISO 14001:2004 Environmental management systems).

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OHS guidelines may include:

- appropriate workplace provision of first aid kits and fire extinguishers
- clean, uncluttered, hygienic workplace
- codes of practice, regulations and/or guidance notes which may apply in a jurisdiction or industry sector
- enterprise-specific OHS procedures, policies or standards
- hazard and risk assessment of workplace, maintenance activities and control measures
- induction or training of staff, contractors and visitors in relevant OHS procedures and/or requirements to allow them to carry out their duties in a safe manner
- OHS training register
- safe lifting, carrying and handling techniques, including manual handling, and the handling and storage of hazardous substances
- safe systems and procedures for outdoor work, including protection from solar radiation, fall protection, confined space entry and the protection of people in the workplace
- systems and procedures for the safe maintenance of property, machinery and equipment, including hydraulics and exposed moving parts
- the appropriate use, maintenance and storage of PPE.

ESD principles may include:

- controlling use and recycling of water, and managing water quality and quantity
- increasing use of renewable, recyclable and recoverable resources
- managing environmental hazard identification, risk assessment and control
- managing imported products quarantine and inspection, facility biosecurity, translocation of livestock and genetic material, and health certification
- managing stock health and welfare, especially for handling, holding, transport and slaughter
- managing sustainable fisheries or broodstock/seedstock collection requirements, such as size limits, quotas, season restrictions,

RANGE STATEMENT

	population dynamics, fishing impacts, reducing by-catch, fisheries management strategies and maintaining biodiversity • managing, controlling and treating effluents, chemical residues, contaminants, wastes and pollution • minimising noise, dust, light or odour emissions • planning environmental and resource efficiency improvements • preventing genetically modified and live cultured or held organisms from escaping into environment • protecting native and protected flora and fauna, marine or land parks or areas, adhering to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), the Ramsar Convention, World Heritage and other international treaties for which Australia is a signatory • reducing emissions of greenhouse gases • reducing use of non-renewable resources • reducing disturbances to soils, erosion and surface water flows from machinery use and other activities • reducing energy use and introducing alternative energy sources.
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RANGE STATEMENT

PPE may include:

- buoyancy vest or personal floatation device (PFD)
- gloves, mitts or gauntlets, and protective hand and arm covering
- hard hat or protective head covering
- hearing protection (e.g. ear plugs and ear muffs)
- insulated protective clothing for freezers or chillers and refrigeration units
- non-slip and waterproof boots (gumboots) or other safety footwear
- personal locator beacon or Emergency Position Indicating Radio Beacon (EPIRB)
- protective eyewear, glasses and face mask
- protective hair, beard and boot covers
- protective outdoor clothing for tropical conditions
- respirator or face mask
- safety harness
- sun protection (e.g. sun hat, sunscreen and sunglasses)
- uniforms, overalls or protective clothing (e.g. mesh and waterproof aprons)
- waterproof clothing (e.g. wet weather gear and waders).

Water quality parameters may include:

- alkalinity
- biological oxygen demand (BOD)
- chlorine or chloramines
- dissolved carbon dioxide
- dissolved oxygen
- general water hardness
- level of nitrogenous wastes (e.g. ammonia, nitrite and nitrate) and contaminants and pollutants
- pH (acid/alkaline balance)
- phosphates
- redox potential
- salinity or conductivity
- temperature
- total dissolved solids.

Environmental parameters may include:

- activity of pests, competitors and predators
- light

RANGE STATEMENT	
	• turbidity • water flow • water level or depth.

RANGE STATEMENT

Cultured or held stock may include:

- adults, broodstock (ready to breed), seedstock or stockers, eggs and sperm, fertilised eggs, larvae, post-larvae, seed, spat, hatchlings, yearlings, juveniles, fry, fingerlings, yearlings, smolt, sporophytes, seedlings, tissue cultures
- finfish, crustaceans, molluscs, aquatic reptiles, amphibians, polychaete and oligochaete worms, plankton, micro-algae, seaweed, aquatic plants, live rock, sponges and other aquatic invertebrates
- for human consumption (seafood), stockers for other farms, stockers for conservation or recreational fishing, display or companion animals (ornamentals), and other products, including pearls, skins, shells, eggs, chemicals and pigments
- wild caught, hatchery or nursery reared.

High technology water treatment components may include:

- aeration or oxygenation equipment, such as aerators, aspirators, airlifts and fans
- components that regulate environmental and climate control factors, such as temperature, photoperiod and light intensity
- degassing systems for removing carbon dioxide and ozone, including the use of specialised air filters
- facilities and processes designed for health management, such as quarantine area, sterilising using ultraviolet (UV) light and ozone, and pasteurising using heat or steam
- mechanical/physical/solid, chemical and biological filtration devices (or a combination of two or more different types):
 - biological filter:
 - is part of an RAS where dissolved metabolic by-products are converted to less toxic forms by microbial action from a range of different bacteria, fungi and other microorganisms
 - the most important function is the oxidation of ammonia to nitrite, and nitrite to nitrate (often called nitrification)
 - chemical filter:
 - examples include activated carbon, zeolites and other ion-exchange mediums

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	• is where a variety of chemical substances are used to treat water passing through them • ozone and chemical, such as pH and alkalinity, adjustments are also made, sometimes in a separate area to the chemical filter • mechanical/physical/solid filter: • includes swirl separators, hydrocones, protein skimmers or foam fractionators, drum filters, belt filters, bead and other suspended media filters and screen filters • is important to ensure organic loads going into biofilters are as low as possible to prevent the more competitive heterotrophic bacteria from taking over and reducing nitrification capacity • is part of an RAS that removes solid organic matter and other wastes • reduces the biological oxygen demand (BOD) for the system • some degassing or carbon dioxide stripping can also take place • ventilation systems, fans, blowers and humidifiers/ dehumidifiers • water treatment devices, such as those that maintain pH (acid/alkaline) balance.
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RANGE STATEMENT	
<i>A recirculating aquaculture system (RAS)</i> is:	• a system in which at least some of the water is recycled one or more times back into the system after some form of treatment • also called a closed system (which is the opposite to a flow-through or open system where there is little residence time for the culture water) • where a water exchange (replacement) rate of 5-10% per day is used to assist in maintaining water quality (particularly nitrate control) • where generally some form of water treatment with equipment or structures, particularly aeration or oxygenation and processing of nitrogenous wastes, is undertaken.
<i>Culture or holding systems</i> may include:	• display tanks, aquaria and aquascapes (ornamental industry) • grow out facilities, hatcheries and nurseries • harvested stock holding structures, tanks, bins and cages • live holding systems • pest, predator and disease control structures • purging or depurating systems • tanks, raceways and RAS • water supply and disposal systems for closed and semi-closed systems.
<i>Information sources</i> may include:	• manufacturer in-service updates • observation of structures, machinery and equipment • operational diaries • operator manuals • other enterprise operators, contractors and service representatives • property improvement groups • relevant government departments • staff comment and/or personal testing of systems.
<i>Relevant information</i> may include:	• capital and operating costs • completed work • maintenance performance • performance limits or specifications • priorities • problems

RANGE STATEMENT	
	• schedules, timetables and deadlines • solutions.

RANGE STATEMENT	
<i>Design or upgrade specifications</i> may include:	• budget • compliance with the standard specification and legislation and regulations of the relevant state or territory construction and power authorities • construction materials of the system or facility • construction method • designated component or system • environmental constraints • equipment and resources • location • number • owner preferences • permits and licences • product or material availability • production requirements, including number, tonnage, timing and production characteristics • quoting procedures • schedule of licensed labour required • security factors • size, volume and footprint area.
<i>Records or reports</i> may include:	• associated equipment and infrastructure • checklists, data sheets, inventory and stocktakes • culture or holding stock species • dates, times and progress against timelines of activities or events • details related to culture or holding structures or systems • electronic or hard copy • Gantt chart • graphs, charts and tables • KPIs • operation and maintenance details and other outcomes achieved • personnel and subcontractor performance data • problems experienced and strategies to overcome them.
<i>Work plans or schedules</i> may include information on:	• contingencies for responding to partial or full system shutdown, stock stress or mortalities • contingency plan to address staffing and equipment supply problems • costs and budget details

RANGE STATEMENT

	• date and time tasks are to be undertaken • designated jobs tasks, directions or designs • environmental impact control measures • expected time required to complete activities • hazard identification, risk assessment and risk control measures • local, state, territory and federal government regulations • location • maintenance schedule for particular items of equipment • manufacturer guidelines or instructions • materials, supplies, tools, equipment or other resources required • monitoring and reporting requirements and procedures, including logs or checklists • non-conformance or incident/fault reporting procedures • OHS procedures, including PPE requirements • order of activities • other members of work team and their roles, responsibilities and skills • pre- and post-operational and safety checks • preferred supplier list and resources required by external workers and tradespeople • routine maintenance procedures • specific structures or components • standard for completed activities • the person in charge.
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RANGE STATEMENT	
<i>Planning and operational requirements</i> to be considered include:	• business plan, strategic plan and budgets • climatic conditions and changes • marketing requirements • production amounts and specifications • seasonal variations or production cycle • staff and contractor availability • verbal instructions.
<i>Enterprise requirements</i> may include:	• enterprise policies and procedures, including those relevant to waste disposal, recycling and reuse guidelines • industry standards or codes of practice • material safety data sheets (MSDS) • OHS procedures • operations or maintenance manuals • product labels, manufacturer specifications or guidelines • production schedules • work procedures • supervisor oral or written instructions • work and routine maintenance plans • work notes.
<i>Resource and supply provision</i> may include:	• machinery, equipment and materials, including welders (e.g. arc, gas and metal inert gas [MIG]), lathes, bench presses, multimeters and ohm meters, inspection pits, lifting and support equipment (e.g. jacks, overhead gantry and blocks), power tools (e.g. grinders and drills) and hand tools (e.g. spanners, hammers and screwdrivers) • workshop storage requirements, including racks for commonly used steel angle, rods, tube metal and wire, or boards for orderly placement of tools.
<i>Contingency options</i> may need to address:	• adverse weather conditions and acts of nature (e.g. flood or fire) • breakdown of components • bypass of components • compromised water source • disease outbreaks • emergency procedures • non-standard water quality parameters

RANGE STATEMENT	
	• risks to culture stock during emergency shutdowns or breakdowns • risks to environment • risks to infrastructure and equipment • risks to product quality and food safety.
<i>Production inputs and other culture or holding activities</i> may include:	• aeration and oxygenation • control and treatment of pests, predators and diseases • food and nutriment • grading • handling • harvesting • holding or storage • post-harvest and processing • stocking • transport • water quality treatment • water supply and disposal.

Unit Sector(s)

Unit sector	Aquaculture operations
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Co-requisite units

Co-requisite units	

Competency field

Competency field	
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