

Training Package	Rural Production (RTE03)	HSC Requirements and Advice
Title	Monitor water supplies	
Unit code RTE2114A	This competency standard covers the process of monitoring the supply of potable water for livestock from water storages and sources. It requires the ability to record and report water supply information, activities and system performance, read and follow manufacturers' procedures, identify blockages, check flow rates and follow OHS procedures. Monitoring the supply of water requires knowledge of water delivery systems and components and their operation, enterprise procedures for carrying out inspections, recording and reporting water information and system performance and OHS requirements for working outdoors, with water supplies. This work is undertaken under routine supervision.	HSC Indicative Hours 15

Evidence Guide

What evidence is required to demonstrate competence for this standard as a whole?

Competence in monitoring water supplies and pumps requires evidence that a person can inspect and report on water supplies with only routine supervision, inspect equipment for blockages, and clear them using safe working procedures.

The skills and knowledge required to monitor water supplies must be **transferable** to a different work environment. For example, this could include maintenance, monitoring and operation of different bores, pumps and water supply systems.

What specific knowledge is needed to achieve the performance criteria?	What specific skills are needed to achieve the performance criteria?	Are there other competency standards that could be assessed with this one?	Assessment guide	HSC Requirements and Advice
<p>Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this competency standard are listed below:</p> <ul style="list-style-type: none"> • water delivery systems and components and their operation • enterprise procedures for carrying out inspections, recording and reporting water information and system performance • OHS requirements for working outdoors, with water supplies. 	<p>To achieve the performance criteria, appropriate literacy and numeracy levels as well as some complimentary skills are required. These include the ability to:</p> <ul style="list-style-type: none"> • record and report water supply information, activities and system performance • read and follow manufacturers procedures • problem solve to identify potential as well as actual blockages • check outflow rates • follow OHS procedures relating to outdoor work, water supplies. 	<p>This competency standard <u>could</u> be assessed on its own or in combination with other competencies relevant to the job function.</p>	<p>There is essential information about assessing this competency standard for consistent performance and where and how it may be assessed, in the Assessment Guidelines for this Training Package. All users of these competency standards must have access to the Assessment Guidelines. Further advice may also be sought from the relevant Sector Booklet.</p>	<p>Key Terms and Concepts</p> <ul style="list-style-type: none"> • assessment of water quality • blockages • common fault indicators • enterprise procedures • external strainers • filter servicing • intake point and lines • monitoring water supplies • occupational health and safety (OHS) • outflow • outlet point • potable water • recording and reporting • risk assessment • routine inspections • safe work practices

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				<ul style="list-style-type: none"> • town reticulated supply • water delivery equipment and systems • water filters • water levels • water pumps • water quality assessment • water quality problems • water storage • water supply and components • water system operation • water treatments.

Element	Performance Criteria	Range of Variables	HSC Requirements and Advice
1 Monitor water supplies	1.1 Routine inspections of water supplies are carried out in accordance with enterprise policy and procedures	<p>The Range of Variables explains the contexts within which the performance and knowledge requirements of this standard may be assessed. The scope of variables chosen in training and assessment requirements may depend on the work situations available.</p> <p>For more information on contexts, environment and variables for training and assessment refer to the Sector Booklet.</p> <p>What is covered under routine inspections?</p> <p>Routine inspections may include water levels, water quality, colloids, salts and water supplies may also need to be tested for evidence of pathogens. Checks are made of medication tanks, drinker lines, filters, fogging systems, pumping systems, dams or town supplies as applicable.</p> <p>What water supplies may need to be monitored?</p> <p>Water supplies may include rivers, dams, ponds, bores, tanks, town or mains water, and recycled water.</p> <p>What might be included in enterprise policy and procedures?</p> <p>These may include operating manuals, recording and reporting requirements and OHS procedures for outdoor work such as protection from solar radiation, dust and noise, protection from drowning in rivers or dams and procedures for working at heights to monitor water levels in tanks.</p>	<p>Learning experiences for the HSC must address:</p> <p>Awareness of a range of water supplies and components including:</p> <ul style="list-style-type: none"> • creeks, rivers and water supply channels • dams • ponds • bores and wells • town reticulated supply • waste water treatment systems • storage tanks • pumps <ul style="list-style-type: none"> – submersible – windmills – solar, electric, motor driven – centrifugal (single and multi-stage) – piston – jet – mono – axial flow – rotor – diaphragm • pressure tanks • taps and gate valves • air bleeders • troughs • self-waterers • filters • pressure gauge • foot valves. <p>Reasons for conducting inspections of water systems:</p> <ul style="list-style-type: none"> • determine the quantities of water available in the supply system • determine the quality of water in the supply system <ul style="list-style-type: none"> – chemical status – physical status – biological status • identify problems in the water storage and delivery system

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			<ul style="list-style-type: none"> • identify problems and faults in individual delivery components. <p>Undesirable production and welfare consequences as a result of failure of water supply and delivery system including:</p> <ul style="list-style-type: none"> • stress and possible death of livestock through dehydration • reduction in livestock production • illness and possible death from biological contaminants. <p>Common faults and indicators for routine inspections including:</p> <ul style="list-style-type: none"> • water storage <ul style="list-style-type: none"> – low levels in water storages – overflowing tanks • water quality <ul style="list-style-type: none"> – high water turbidity – unusual odour or taste in water – biological or chemical contamination • water delivery <ul style="list-style-type: none"> – low water pressure – low flow rates – leaking pipes – wet and boggy patches of soil around water supply facilities – blocked filters – blocked foot valves – air leaks in pump suction pipes – damaged pumps – leaking taps and gate valves – over-flowing water troughs – high water meter readings. <p>Occupational health and safety issues associated with monitoring water systems including:</p> <ul style="list-style-type: none"> • electrical shock from electric pumps • hearing damage from petrol and diesel driven pumps • falling injury from windmills, tank stands and ladders • carbon monoxide poisoning from petrol- and

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			<p>diesel-driven pumps housed in poorly ventilated pump sheds</p> <ul style="list-style-type: none"> • snakebite and spider bite • risks associated with entering confined spaces such as water tanks • drowning • loose clothing and moving parts • missing or damaged guards.
	<p>1.2 High and low water levels are recognised and reported</p>		<p>Learning experiences for the HSC must address:</p> <p>Methods of determining high and low water levels including:</p> <ul style="list-style-type: none"> • depth gauges • measuring sticks • float markers • visual gauges. <p>Verbal and non-verbal reporting mechanisms.</p>
	<p>1.3 Where water quality problems or pathogens are found, treatment is carried out in accordance with enterprise procedures</p>	<p>How might water need to be treated?</p> <p>Where pathogens are found to be present, water should be sanitised before being provided to livestock. In line water medicators should be checked if applicable. Hand dosing of water supply may also be necessary.</p>	<p>Learning experiences for the HSC must address:</p> <p>A basic understanding of water quality problems including:</p> <ul style="list-style-type: none"> • chemical <ul style="list-style-type: none"> – pH – total soluble salts (TSS) – electrical conductivity – sulphates – carbonates – water hardness – dissolved oxygen • physical <ul style="list-style-type: none"> – turbidity – colour – smell – taste – gross pollutants • organic <ul style="list-style-type: none"> – Biological Oxygen Demand (BOD₅) • biological <ul style="list-style-type: none"> – presence of aquatic macro-invertebrates – algae

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			<p>Requirements for assessment of water quality including:</p> <ul style="list-style-type: none"> • chemical assessment using accredited laboratories • simple chemical assessment using hand-held pH and electrical conductivity meters • laboratory measurement of BOD₅ • setting benchmarks to determine changes in physical and biological qualities. <p>Water treatment procedures including:</p> <ul style="list-style-type: none"> • water softeners • water filters • boiling.
	<p>1.4 Information on water supplies is recorded and reported in accordance with enterprise policy and procedures</p>	<p>What information on water supplies may be recorded?</p> <p>Information may include water levels, water quality problems such as presence of gross pollutants, oil and plant/algal growths, evidence of pathogens.</p>	<p>Learning experiences for the HSC must address:</p> <p>Verbal and non-verbal reporting mechanisms.</p> <p>Recording of information including:</p> <ul style="list-style-type: none"> • water levels • water quality problems • equipment faults identified • repairs undertaken • future monitoring requirements.
<p>2 Inspect and clear intake and outlet points</p>	<p>2.1 Intakes and outlets are inspected</p>		<p>Learning experiences for the HSC must address:</p> <p>Inlets inspected for:</p> <ul style="list-style-type: none"> • blockages caused by <ul style="list-style-type: none"> – foot valves sitting in silt and mud – aquatic plant and algae – vegetation overgrowth – build up of rust or scale – sludge – aquatic vertebrates such as fish, frogs and tadpoles – debris • damage <ul style="list-style-type: none"> – rust – corrosion – physical.

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			<p>Outlets inspected for:</p> <ul style="list-style-type: none"> • leakages caused by <ul style="list-style-type: none"> – frost damage – incorrect installation – worn components • damage <ul style="list-style-type: none"> – rust – corrosion – physical.
	<p>2.2 Potential blockages are reported and actual blockages are cleared in accordance with safe working procedures</p>	<p>What blockages might need to be cleared?</p> <p>Blockages may be caused by vegetation overgrowth, sludge, animal carcasses and debris.</p> <p>What safe working procedures might be relevant to clearing blockages?</p> <p>These might include the selection and use of relevant personal protective clothing and equipment, safe use of hand tools, relevant manual handling procedures, protection against contamination and safe disposal of materials causing pump blockages.</p>	<p>Learning experiences for the HSC must address:</p> <p>Procedures for clearing blockages including:</p> <ul style="list-style-type: none"> • shutting down the water supply or pumping system • closing appropriate gate valves • dismantling the system using appropriate tools or using qualified trades people • clearing blockages or replacing blocked components • re-assembling water system • re-commissioning water supply • testing repairs for effectiveness and leaks. <p>Safe work practices including:</p> <ul style="list-style-type: none"> • turning off electricity supplies • using correctly fitting and adjusted tools • avoiding use of <i>ad hoc</i> techniques to increase leverage of wrenches and stillson • avoiding excessive physical strain • using buoyancy devices when working in full water storages, dams and creeks • performing OHS risk assessments and implementing appropriate controls where unacceptable risks are identified • manual handling techniques when moving heavy pipes or pipes filled with water • use of appropriate personal protective equipment (PPE) • protection from oil and fuel pollutants around pump facilities • protection from water pollutants such as blue-green algae toxins.

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	2.3 Water filters are checked and replaced as required.		<p>Learning experiences for the HSC must address:</p> <p>Servicing of water filters including:</p> <ul style="list-style-type: none"> • plate filters • sand filters • mesh filters • paper element filters.
	2.4 Intake lines are repositioned as necessary to ensure unobstructed suction		<p>Learning experiences for the HSC must address:</p> <p>Reasons for repositioning including:</p> <ul style="list-style-type: none"> • build up of silt • overgrowth of aquatic vegetation • shift in stream bed • change in stream velocity. <p>Positioning of intake lines involving use of:</p> <ul style="list-style-type: none"> • floatation devices • stays and guy wires to hold in position • cages to prevent blockages.
	2.5 Strainers are cleared of debris and sludge	<p>What strainers are relevant to this standard?</p> <p>Strainers include only those external to the pump. Livestock water supply systems may incorporate water filter systems which need to be regularly checked.</p>	
3 Operate water delivery equipment	3.1 Water delivery equipment is prepared and checked in accordance with enterprise procedures	<p>What types of water delivery equipment may be relevant to this standard?</p> <p>Water delivery equipment may include pumps types such as centrifugal, submersible, rotor, jet, diaphragm, piston, windmill and multi-stage centrifugal types, and axial flow.</p> <p>What OHS requirements relate to starting pumps?</p> <p>OHS requirements may include procedures for prevention of electrical injury and protection of hearing, working outdoors, and working in confined spaces.</p>	<p>Learning experiences for the HSC must address:</p> <p>Procedures for operating water pumps including:</p> <ul style="list-style-type: none"> • priming the pump • checking for leaks in glands and seals • starting the pump according to operating procedures • checking pump operation for flow rate and pressure • ensuring watchdog systems are operating for problems such as low oil pressure and low water pressure.

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	3.2 Water delivery equipment operated in accordance with manufacturers procedures and OHS requirements		<p>Learning experiences for the HSC must address:</p> <p>Procedures to follow when operating a water delivery system including:</p> <ul style="list-style-type: none"> • determination of the specific components of the system • accessing all operation manuals for pumps, filters and other components • communicating with people who have used or are currently responsible for operating the system to determine its characteristics • noting procedures specific to a system • noting problems and faults • monitoring the operation of the system • the need for scheduled maintenance to avoid the need for emergency repairs • monitoring animal use of the water system.
	3.3 Outflow is checked to ensure water delivery equipment is operating correctly		<p>Learning experiences for the HSC must address:</p> <p>Checking outflow by:</p> <ul style="list-style-type: none"> • measuring the rate of flow per unit of time and comparing this to design specifications • comparing flow with previous normal operation • keeping records in order to track long-term changes in system performance.
	3.4 Water delivery equipment is shut down as required in accordance with enterprise procedures		<p>Learning experiences for the HSC must address:</p> <p>Reasons for shutting down water delivery equipment including:</p> <ul style="list-style-type: none"> • malfunctions • risk of major equipment damage • maintenance and repairs • enterprise requirements • low water reserves • poor water quality. <p>Procedures to follow when operating a water delivery system including:</p> <ul style="list-style-type: none"> • determining the specific components of the system • accessing all operation manuals for pumps,

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	3.5 Activities and water delivery equipment function are reported in accordance with enterprise procedures		<ul style="list-style-type: none"> • filters and other components • communicating with people who have used or are currently responsible for operating the system to determine its characteristics • noting procedures specific to a system • noting problems and faults • monitoring the operation of the system • scheduled maintenance to avoid the need for emergency repairs. <p>Learning experiences for the HSC must address: Verbal and non-verbal reporting.</p> <p>Activities and functions to be reported including:</p> <ul style="list-style-type: none"> • operation • shutdown • system performance.

What processes should be applied to this competency standard?

There are a number of processes that are learnt throughout work and life, which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the **key competencies**, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the level to which the key competency needs to be demonstrated where

0 = not required 1 = perform the process 2 = perform and administer the process 3 = perform, administer and design the process

1. How can communication of ideas and information (1) be applied?	Through verbal and written reports of water levels, activities and pump function.
2. How can information be collected, analysed and organised (1) ?	Recording data for water supplies and sources.
3. How are activities planned and organised (1) ?	Checking operation of water supply on a daily basis.
4. How can team work (1) be applied?	Co-ordinating monitoring activities with others.
5. How can the use of mathematical ideas and techniques (1) be applied?	Estimating water level depths and recognising when these are low.
6. How can problem-solving skills (1) be applied?	Identifying potential blockages and repositioning intake lines.
7. How can the use of technology (1) be applied?	Preparing records and reports.