

1. Module details**Module name****Water Supply – Sources, Collection and Storage****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

Module code

NUE024

Discipline code

0702130

2. Module purpose

This module will provide the learners with the skills required to operate and carry out minor maintenance and repairs to the communities potable water collection and storage facilities.

3. Prerequisites

Nil.

4. Relationship to competency standards

This module provides part of the underpinning knowledge and skills in the 'Evidence Guide' of specific units of competency in the National Electrotechnology Training Package and provides similar support, where mapped, to equivalent units in the National Metals and Engineering Competency Standards. For details refer to the module to unit maps, available from NUEITAB.

5. Content**Operation of water pumps**

Pump selection

Pump types

Water pump operation

Diesel engine service

Bore operations

Safety awareness

Reading and recording of the systems instruments

Reading and recording information

Mechanical instruments

Electrical instruments

Bore instruments

Flow meters

Notification of faults

Safety awareness

Operation and isolation of components

Isolation valves

Identification and isolation

Systems isolation

Filtration equipment

Inspection of the system

Recognition of faults

Notification of repairs and maintenance
Safety awareness

Maintenance

Painting preparation
Corrosion control
Paint selection
Application methods
Cleaning and storage
Solar panels
Structural
Storage tank
Reporting problems
Housekeeping
Safety awareness

Water sampling (analysis)

Cleaning and scouring
Weeds and debris
Water samples
Recording and reporting information
Reporting of findings
Safety awareness

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.

Conditions of assessment

Learning and assessment will take place in an environment that is conducive to a learner's development.

7. Learning outcome details

Learning outcome 1

Identify, select and operate the correct water pump and drive methods for petrol, diesel or electric for given situations including emergencies at the water collection and storage facilities.

Assessment criteria

- 1.1 Locate and record the position of all the water pumps servicing the water collection and storage facilities (include all bores).
- 1.2 Identify the different types of water pump.
- 1.3 Describe the operation of the different types of water pumps.
- 1.4 Conduct a safety check of the water pumps coupling devices and mechanical guards (drive shafts, flange couplings, universal joints etc).
- 1.5 Operate the different types of water pumps and bores.
- 1.6 Select the most appropriate type or number of water pump(s) for a given situation.
- 1.7 Select the correct bores (number and location) to match the water demand of the community.
- 1.8 Set pump controls for automatic run times.
- 1.9 Service the water pumping facility's diesel/petrol engine.
- 1.10 Start and operate the diesel engine powered water pump.
- 1.11 Explain reasons for the selection of a particular type or number of pump(s).
- 1.12 Identify and report on any major leaks during the operation of the water pump.
- 1.13 Communicate the necessary information using the most suitable available methods eg radio, telephone.
- 1.14 Perform emergency repairs to the collection and storage systems when necessary.
- 1.15 Observe all safety procedures including the wearing of personal protective equipment.

Learning outcome 2

Read and record the information displayed on the instruments used in the potable water collection and storage facilities.

Assessment criteria

- 2.1 Read and record the information displayed on the electrical instruments.
- 2.2 Read and record the water pumps volume and pressure instruments (water flow rate both in and out of the pumping unit).
- 2.3 Read and record the information displayed on the instruments at the bore site(s):
 - Draw down result
 - Rest level result
 - Standing Water Level (SWL).
- 2.4 Report any irregularities in the readings on the instruments to the appropriate person(s).
- 2.5 Check and record the information displayed on the instrument panel of the diesel/petrol engine powered water pump, (when on line):
 - Oil pressure and temperature
 - Coolant temperature
 - Fuel pressure and contents
 - Air flow restriction.
- 2.6 Read and record the water pumping facility's diesel fuel quantity and delivery instruments.
- 2.7 Observe all safety procedures including the wearing of personal protective equipment.

Learning outcome 3

Operate, isolate and carry out minor and or emergency repairs to water valves and ancillary equipment for given water pumping situations.

Assessment criteria

- 3.1 Identify the different types of water valves and flow devices which are in use at the water collection and storage facility.
- 3.2 Describe the operation of the various types of water valves and flow devices.
- 3.3 Describe the make safe methods which are in place at the water collection and storage facility.
- 3.4 Explain the isolation and make safe procedures associated with the different types of valves.
- 3.5 Isolate and make safe a given part of the water collection and storage valve system.
- 3.6 Isolate the filtration system, service the filters and reactivate the system.
- 3.7 Inspect the system and report any leaks and faults to the appropriate person(s).
- 3.8 Carry out minor repairs to the water valves and ancillary components eg washers, hose clamping devices, pipes, guards, brackets etc.
- 3.9 Perform emergency repairs operations to the water collection and storage systems when necessary eg split hoses/pipes. Broken drive belts, damaged hose clamps etc.
- 3.10 Observe all safety procedures including the wearing of personal protective equipment.

Learning outcome 4

Perform repairs and maintenance to the water collection and storage facilities grounds and equipment.

Assessment criteria

- 4.1 Demonstrate the correct preparation methods necessary before repainting: timber, block, concrete or a steel surface.
- 4.2 Describe the correct method used for corrosion control and explain the necessity of the procedures.
- 4.3 List the correct undercoat application and thinning agent as recommended by the manufacturer for both new and previously painted surfaces.
- 4.4 Select the most suitable top coat application and thinning agent as recommended by the manufacturer for the given task.
- 4.5 Explain the problems arising from the use of paints which are incompatible with other paints.
- 4.6 Discuss the health and safety aspects of paint thinning products other than water.
- 4.7 Select the most appropriate method of application eg, roller, brush or paint pads.
- 4.8 Paint selected surface textures located within the community's water collection facilities and compound.
- 4.9 Clean all of the paint application equipment in the appropriate cleaning agent and store it in the correct manner.

*Note All internal protective coatings for potable water storage facilities must comply with the relevant Australian Standards.
The storage of all flammable substances must be stored in the appropriate manner eg, a flammable liquid storage cabinet.
Any activity involving the handling of paint and thinning agents is to be done under strict supervision.*

- 4.10 Carry out minor structural maintenance to the facilities stands, water tanks, compound fences and buildings.

Note Do not enter a water storage tank unless adequate ventilation and all safety procedures are followed, and never alone.

Learning outcome 5

- 4.11 Clean the facility's solar panels and check their condition.
- 4.12 Report and record any fault conditions to the appropriate person(s) to organise repair work.
- 4.13 Clean and store all tools, equipment and consumables in the correct manner, dispose of all used consumables in an environmentally safe manner.
- 4.14 Observe all safety procedures including the wearing of personal protective equipment.

Gather and record water samples from the potable water collection and storage facilities and forward them to the appropriate person(s).

Assessment criteria

- 5.1 Clear all weeds and debris from around the collection and storage facilities, especially the intake areas of the system.
- 5.2 Clean thoroughly the glass test sample beakers and ancillary equipment.
- 5.3 Obtain water samples from various locations as directed.
- 5.4 Record and label the samples and notify the appropriate person(s) for testing of the samples.
- 5.5 Flush and scour the system.
- 5.6 Gather further water samples from the same areas after the clean and scouring.
- 5.7 Record and label the samples and notify the appropriate person(s).
- 5.8 Clean all the testing equipment and store it in a safe and correct manner.
- 5.9 Maintain the pumping stations interior and equipment in a clean and safe condition.
- 5.10 Observe all safety procedures including the wearing of personal protective equipment.

8. Delivery of the module

Delivery strategy

Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective method to achieve this is by integration of theory and practice where students learn by experimentation, research and reports. It is recommended that learning and assessment be facilitated in a holistic manner that may require learning outcome sequence other than that indicated in the module.

Resource requirements

Students will need access to an operational powerhouse to gain maximum benefit from this module. They will also need access to all service manuals for the equipment they are training on.

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers as well as the particular safety procedures followed as part of the learning / teaching activity and content.