Australian Government

Department of Education, Employment and Workplace Relations

NWP362B Monitor, operate and control reclaimed water irrigation

Revision Number: 2

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Modification History

NWP362B Release 2: Layout adjusted. No changes to content.
NWP362B Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to monitor, operate and control reclaimed water irrigation and the use of reclaimed water for irrigation practices.

Application of the Unit

This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for analysing the critical aspects of reclaimed water reuse management relating to a project or site and implementing reclaimed water reuse irrigation in compliance with organisational, environmental and legislative requirements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Assess sites for reclaimed water irrigation.	1.1 Identify soil/water interactions and ***soil properties*** important for plant growth. 1.2 Identify soil ***sampling*** sites, collect samples and conduct ***soil testing***. 1.3 Classify soils using field texture, pH and structure analysis. 1.4 Monitor and determine the ***water holding capacity*** of the soil.
2 Assess quality of reclaimed water for irrigation.	2.1 Sample and test reclaimed water and interpret ***quality parameters***. 2.2 Determine crops suitable for the quality of reclaimed water and site conditions.
3 Implement reclaimed water irrigation.	3.1 Identify basic features of ***irrigation systems***. 3.2 Operate and maintain irrigation ***equipment*** according to organisational requirements. 3.3 Identify and apply irrigation ***scheduling options*** for reclaimed water. 3.4 Use crop factors and climate data to produce ***water budgets***. 3.5 Apply irrigation water and collect and monitor tail water or runoff according to ***organisational and statutory requirements***.
4 Respond to water or soil quality issues.	4.1 Develop ***irrigation management options*** to respond to water quality issues. 4.2 Identify and apply requirements and options for ***soil ameliorants***. 4.3 Monitor infiltration and drainage according to organisational requirements.
5 Compile reclaimed water irrigation records.	5.1 Compile ***reports*** to meet organisational procedures and statutory requirements. 5.2 Report observations outside defined parameters for further action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- implement best practice irrigation procedures
- monitor and manage soil
- solve operational problems
- access, interpret and apply relevant legislation
- apply environmental policies, plans and procedures
- apply control procedures to environmental risks and incidents
- assess environmental risks at the work site
- report and record environmental procedures
- access, interpret and apply standard operating procedures
- communicate effectively with customers
- complete basic workplace records and/or reports
- identify soil groups
- use safety and personal protective equipment
- perform work-related calculations
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- sample and test soil and water

Required knowledge:

- key principles of irrigation practices, including irrigation scheduling
- key characteristics of reclaimed water
- relevant legislative requirements
- standard operating procedures
- environmental management procedures
- control procedures for environmental risks and incidents
- risk assessment procedures
- environmental impact assessment
- recording procedures
- reporting procedures
- established environmental management procedures
- risk assessment procedures
- primary agencies involved in drinking water quality management
- water quality performance indicators
- an overview of the water supply system
- water hazardous agents and preventative strategies
- community and agency roles and responsibilities in monitoring water quality
- best management practices for the use of reclaimed water for irrigation purposes

- reclaimed water usage licensing procedures and requirements
- environmental, landscape and ground structure of work area
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- interpretation and use of material safety data sheets

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The candidate should demonstrate the ability to monitor, operate and control reclaimed water irrigation, including:

- analysis of the critical aspects of reclaimed water reuse management relating to the project or site
- implementing reclaimed water reuse irrigation
- identifying environment, health and safety risks and impact on soil, stock and operators
- applying environmental procedures
- participating in and contributing to reviews of reclaimed water reuse procedures

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- collecting and noting circumstances and observations relating to a specific breaches of legislation
- relevant codes, standards, and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

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. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Soil properties may include:

- surface soil
- subsoil
- soil profiles
- a, b & c horizons
- texture:
  - rock/gravel
  - sand
  - silt
  - clay
- soil structure
- aggregates
- minerals
- pores
- soil colour

Soil sampling may include:

- selection of sample site/s using methods such as:
  - grid
  - random
  - zigzag
  - transect
- collection of samples from:
  - field pits
  - auger holes
- consistent application of sampling procedures as identified by the Department of Agriculture
- maintenance of the integrity of the sample according to applicable statutory guidelines (Department of Agriculture, EPA)

Soil testing may include:

- soil pH
- soil texture assessment
- mottle colour
- soil nutrients
- nitrogen
- phosphorus (Olsen P or Colwell P)
- potassium
- fertiliser requirements

- cation exchange capacity (CEC)
- exchangeable sodium percentage (ESP)
- calcium/magnesium ratio
- organic matter
- hydraulic conductivity
- consistence (dry only)
- strength
- stickiness
- plasticity
- Emerson dispersion grade

Water holding capacity may include:

- hydraulic conductivity
- soil water potential
- infiltration/leaching rates
- field capacity determination

Reclaimed water ***quality parameters*** may include:

- pH
- BOD/COD
- total salt concentration
- total Dissolved Solids (TDS)
- soluble salts by electrical conductivity (EC)
- nutrients - N, P, K
- anions and cations
- sodium adsorption ratio (SAR)
- adjusted SAR

Irrigation systems may include:

- border check flood irrigation
- graded or contour furrows
- sub-surface irrigation
- sprinklers
- localised systems, such as:
  - drip
  - micro spray
  - trickle

Equipment may include:

- electronic monitoring and metering systems
- reclaimed water flow distribution systems, including:
  - pipes
  - valves
  - pumps
  - channels
  - checks
  - drains
  - collection dams
  - flow control gates

- pressured distribution equipment, such as:
  - sprinklers
  - travelling irrigators
- sampling and testing equipment
- infiltration testing equipment
- manual chart recording systems
- on- and off-road vehicles
- communication equipment
- atmosphere monitoring equipment
- personal protective equipment
- communication equipment
- computerised equipment

Irrigation ***scheduling options*** may include:

- measurement of soil moisture content
- on-site, physical soil moisture investigations
- evaporation minus rainfall calculations
- tensiometers
- gypsum blocks
- neutron probes
- capacitance probes

Water budgets may include:

- weather details
- rainfall
- evaporation
- crop factors and predicted plant water requirement
- leaching requirements
- soil types and characteristics
- monthly/yearly calculation of reclaimed water required
- calculation of suitable land areas for use

Organisational requirements may include:

- organisational policies and procedures
- occupational health and safety
- electrical and mechanical procedures

Statutory requirements may include:

- environmental legislation, including relevant:
  - Federal legislation
  - State/Territory legislations
  - local government by-laws
  - government or quasi-government policies and regulations
  - community planning and development agreements, such as land care agreements
- Water Acts
- licensing and/or drainage agreements
- plumbing and drainage standards

	• hazardous substances • World Health Organisation standards • NHMRC guidelines
Irrigation management options may include:	• shandying to reduce salt or nutrient loads • managing algal outbreaks • identification and reduction of odours from irrigation • restricting livestock or public access due to water quality issues • suspension of irrigation
Soil ameliorants may include:	• gypsum (calcium sulphate) • hydrated lime (limil) • agricultural lime (calcium carbonate) • biosolids

Reports may include:	• reclaimed water irrigation data including:
	  • applications dates and volumes applied
	  • volumes of run-off
	  • water quality
	• rainfall, evaporation and/or other meteorological data
	• water budgets
	• salt budgets
	• plant performance data

Unit Sector(s)

Not applicable.

Competency field

Collection and distribution.