



Australian Government

Department of Education, Employment and Workplace Relations

NWP406A Investigate and plan the optimisation of granular media filtration processes

Release: 2

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Modification History

NWP406A Release 2: Layout adjusted. No changes to content.
NWP406A Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to evaluate and report on system performance and process quality control and may require the control and coordination of granular media filtration processes used in water and wastewater treatment.

Application of the Unit

This unit is required by technical staff with responsibility for optimising granular media filtration processes in water or wastewater treatment plants. This role may include coordination or supervision of a work team, or may be performed by a single operator, depending on the size of the treatment plant. The role will be managed under indirect supervision.

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 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 Evaluate granular media filtration process performance.	<p>1.1 Review existing process performance data against relevant <i>organisational or legislative requirements</i>.</p> <p>1.2 Review existing operational <i>processes</i> with reference to <i>manufacturers' and plant designers' specifications</i>.</p> <p>1.3 Identify the impact of <i>incoming water quality</i> on granular media filtration processes as required.</p> <p>1.4 Identify and coordinate any additional sampling and <i>testing</i> required for valid evaluation of current process performance.</p>
2 Investigate granular media filtration plant or equipment operation.	<p>2.1 Review existing fault reports and other relevant plant asset information.</p> <p>2.2 Investigate the operational status of <i>plant components</i> with reference to manufacturers' and plant designers' specifications.</p>
3 Investigate the operational options for process optimisation.	<p>3.1 Review relevant fault and incident reports and remedial actions taken.</p> <p>3.2 Investigate current <i>media status</i> with reference to manufacturers' or plant designers' specifications.</p> <p>3.3 Investigate <i>potential changes to operational processes</i> to identify possible optimisation strategies.</p>
4 Develop and record a plan for process optimisation.	<p>4.1 Determine plant configuration or media options and revised operational procedures for process optimisation.</p> <p>4.2 Plan a trial to test the performance of the determined optimisation options.</p> <p>4.3 Compile a report making recommendations on optimisation options.</p>

Required Skills and Knowledge

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

Required skills:

- conduct system investigation and report on operational or control system problems
- coordinate filter inspection, sampling and testing
- conduct trend analysis for long term filter monitoring
- perform calculations to provide data for the analysis and development of options and solutions, such as backwash rates and filtration rates
- determine filter run and backwash profiles and times
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
 - regulatory, legislative, licensing and organisational requirements
 - codes and standards
 - specifications
 - organisational policies
- articulate complex ideas clearly
- work collaboratively with relevant stakeholders and team members
- analyse problems and recommend appropriate remedial solutions
- identify risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance

Required knowledge:

- principles that form the basis of granular media filtration processes
- environmental legislation requirements for water quality and environmental protection
- types of filters and their range of applications, conditions for use and manufacturers' requirements
- backwash principles and optimisation
- filter run profiles
- the range and performance of filter aids
- filter media properties and selection
- filter inspection and sampling
- principles of filter maintenance, including cleaning filters, double backwashes, surface cleaning, lancing, caustic washing
- filter ripening and turbidity breakthrough
- pilot filters

- system layout
- pumping and valving systems
- control and communication systems
- relevant historical records
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- relevant standards and workplace policies and procedures

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.

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

The candidate should demonstrate the ability to evaluate and report on system performance and process quality control including:

- reviewing existing filtration process performance with reference to historical data, initial specifications and differences in incoming water quality
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing faults and incident reports and investigating the status of filtration plant components and media
- investigating potential changes to filtration operational processes to identify possible optimisation strategies
- planning trials to test the performance of the determined filtration optimisation options and compiling reports making recommendations

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
- 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 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 only taken at the point 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 and cultural issues that may affect responses to the questions, and will reflect 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. 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.

Organisational or legislative requirements may include:

- organisational performance quality standards
- standard operating procedures
- quality assurance guidelines
- federal, state and local environmental and water quality legislation
- occupational health and safety requirements
- water quality standards and guidelines

Processes may include:

- slow granular media filters
- conventional granular media filters
- pressure and gravity granular media filters

Manufacturers' and plant designers' specifications may include:

- filtration rates
- backwash rate and time
- air scour rate and time
- media profile
- media depth
- blower capacity
- filter aid addition
- intended plant configuration

Incoming water quality may include:

- turbidity
- colour
- presence of algae
- temperature

Testing may include:

- turbidity
- true colour
- filter run profile
- particle counting
- headloss
- media expansion rates
- solids retention profile

Plant components may include:

- valves
- blower
- wash water troughs
- under drain system
- nozzles and air scour components

- control systems
 - filter cell
 - surface washers
 - turbidity meter
 - particle counter
- Media status* may include:
- regularity of surface
 - media profile
 - media depth
 - media uniformity
 - solids retention profile
 - presence of contaminants
- Potential changes to operational processes* may include:
- backwash rates, times and sequence
 - filtration rates
 - air scour rate and time
 - filter aid addition
 - storage of offline filters

Unit Sector(s)

Not applicable.

Competency field

Treatment.