



Australian Government

Department of Education, Employment and Workplace Relations

NWP408A Investigate and plan the optimisation of sedimentation and clarification processes

Release: 2

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Modification History

NWP408A Release 2: Layout adjusted. No changes to content.
NWP408A Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to evaluate system performance and investigate and report on optimisation of sedimentation and clarification processes.

Application of the Unit

This unit is required by technical staff with responsibility for optimising sedimentation and clarification processes in water and wastewater treatment plants. This role may be a single operator or may be performed as part of a team with some responsibility for team coordination and supervision depending on the size of the treatment plant.

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 sedimentation and clarification process performance.	<p>1.1 Review existing process performance data against relevant <i>organisational or legislative requirements</i>.</p> <p>1.2 Identify the impact of changing <i>incoming water quality</i> on sedimentation and clarification <i>processes</i> in a range of conditions.</p> <p>1.3 Identify and coordinate any additional sampling and <i>testing</i> required for valid evaluation of current process performance.</p>
2 Investigate sedimentation and clarification assets.	<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 <i>manufacturers' and plant designers'</i> specifications.</p>
3 Investigate process optimisation.	<p>3.1 Review relevant fault and incident reports and remedial actions taken.</p> <p>3.2 Investigate <i>potential changes to operational processes</i> to identify possible optimisation strategies.</p>
4 Plan process optimisation.	<p>4.1 Determine plant configuration and revised operational processes 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 investigations and report on operational or control system problems
- coordinate sedimentation and clarification inspection, sampling and testing
- perform various calculations to provide data for the analysis and development of options and solutions, such as surface loading rate, upflow velocity, detention time and weir loading rate
- 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
- prepare and apply chemical dosing

Required knowledge:

- principles that form the basis of sedimentation and clarification processes
- types of sedimentation and clarification processes
- re-establishing sludge blankets
- polymers and weighting agents
- principles of sedimentation and clarification system maintenance
- system layout
- pumping and valving systems
- relevant historical records
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles related to sedimentation and clarification systems
- relevant legislation, standards and workplace policies and procedures
- chemical dosing processes

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 system performance and investigate and report on optimisation of sedimentation and clarification processes including:

- reviewing existing sedimentation and clarification process performance with reference to historical data, differences in incoming water quality and plant configuration
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of sedimentation and clarification plant components
- investigating current and potential chemical addition practices
- planning trials to test the performance of the determined sedimentation and clarification 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

Incoming water quality may include:

- turbidity
- colour
- presence of algae
- temperature

Processes may include:

- sludge blanket clarifiers
- conventional clarifiers
- tube settlers
- high rate plate settlers
- recirculating contact clarifiers
- pulsator clarifiers
- ballasted sedimentation

Testing may include:

- turbidity
- true colour
- float solids content

Plant components may include:

- valves
- sludge pumps
- impellers
- sludge collection cones
- sludge rake
- tube and plate settlers
- weirs or launders
- dosing points

Manufacturers' and plant designers' specifications may include:

- surface loading rate
- upflow velocity
- detention time
- weir loading rate
- slurry recirculation rate

Potential changes to operational processes may include:

- intended plant configuration
- flow rate
- polymer addition
- slurry recirculation rate
- sludge wasting rate
- sludge blanket concentration and depth

Unit Sector(s)

Not applicable.

Competency field

Treatment.