



Australian Government

NWPTRT049 Assess and improve activated sludge and biological nutrient removal processes

Release: 1

NWPTRT049 Assess and improve activated sludge and biological nutrient removal processes

Modification History

Release 1. This is the first release of this unit of competency in the NWP National Water Training Package.

Application

This unit involves the skills and knowledge required to assess and improve activated sludge and biological nutrient removal (BNR) processes.

It includes assessing, evaluating system performance and investigating and reporting on the optimisation of activated sludge and biological nitrogen or phosphorus removal treatment processes.

This unit applies to those working as technical staff with a specific responsibility for optimising activated sludge and BNR treatment processes. Those undertaking this unit would work autonomously, usually with supervisory responsibilities, while performing complex tasks in a range of contexts.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Not applicable.

Competency Field

Treatment

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential Performance criteria describe the performance needed to

outcomes.

demonstrate achievement of the element.

- | | |
|---|--|
| 1 Evaluate activated sludge and BNR processes | 1.1 Review existing process performance data against activated sludge and BNR organisational operating protocol

1.2 Identify the impact of influent quality on activated sludge and BNR treatment processes

1.3 Identify additional sampling and testing required for valid evaluation of current process performance |
| 2 Investigate activated sludge and BNR configuration | 2.1 Assess existing effluent quality reports, fault reports and other relevant plant asset information

2.2 Investigate the operational status of plant components with reference to manufacturer and plant design specifications

2.3 Assess the effectiveness of process control strategies

2.4 Identify treatment process conditions for optimising the growth of beneficial microorganisms

2.5 Identify hazards, assess risks and control measures according to workplace procedures

2.6 Identify biological risks and controls |
| 3 Develop and record a plan for process optimisation | 3.1 Determine plant configuration or chemical options for process optimisation

3.2 Plan a trial to test the performance of the determined optimisation options

3.3 Compile report with recommendations on optimisation options |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

Non-essential conditions may be found in the Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to NWPTRT084 Assess and improve activated sludge and nutrient removal processes.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Assessment Requirements for NWPTRT049 Assess and improve activated sludge and biological nutrient removal processes

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria on at least one occasion and includes:

- assessing fault reports and investigating the current operational status of activated sludge or biological nutrient removal (BNR) treatment process plant components
- determining data relevance
- identifying a range of wastewater microorganisms, and their general characteristics and types of problems caused
- identifying and responding to risks and hazards
- identifying effluent quality and selecting process control strategies to optimise the growth of beneficial microorganisms
- identifying wastewater characteristics that impact on microorganism growth
- interpreting a range of complex and technical documents including at least one of the following:
 - codes of practice
 - national and industry standards
 - organisational policies
 - regulatory, legislative, licensing and organisational requirements
 - specifications
- investigating and optimising return and wasting rates
- investigating current and potential chemical addition practices
- operating an activated sludge and nutrient removal process
- performing various calculations to provide data for the analysis and development of options and solutions, including at least one of the following:
 - food to microorganism ratio (F:M ratio)
 - sludge age
- planning trials to test the performance of the determined activated sludge or BNR treatment process optimisation options
- preparing reports outlining the optimum treatment for various microorganisms including measures to ensure validity
- reviewing existing activated sludge or BNR treatment process performance with reference to historical data, differences in influent water quality and plant configuration

- selecting measures to optimise the growth of beneficial microorganisms

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria and include knowledge of:

- activated sludge and BNR microbiology
- effluent quality and process control strategies
- impact of process variables including:
 - carbon dosing
 - dissolved oxygen
 - mixed liquor suspended solids
 - mixed liquor volatile suspended solids
 - pre-fermentation and readily biodegradable carbon
 - recirculation
 - sludge age
- operational problems caused by wastewater microorganisms
- principles that form the basis of activated sludge treatment processes
- principles that form the basis of BNR-activated sludge treatment processes, including nitrification and de-nitrification, enhanced biological phosphorus removal
- process control strategies
- relevant legislation, industry standards and workplace policies and procedures relating directly to assess activated sludge and BNR microbiology
- risk and hazard management principles
- types of activated sludge and BNR-activated sludge treatment processes including:
 - Anammox and Microbi
 - Nereda
 - Nitrite shunt
- workplace reporting requirements

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- relevant and appropriate materials, tools, equipment and personal protective equipment currently used in industry
- applicable documentation including legislation, regulations, codes of practice, workplace procedures and operation manuals.

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