



Australian Government

NWPTRT011 Assess and improve chemical dosing process

Release: 1

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Modification History

Release	Comments
1	This unit was released in NWP Water Training Package release 1.0 and meets the Standards for Training Packages. This unit supersedes and is equivalent to NWP409A Investigate and plan to optimise the operation of chemical addition processes. • Unit code updated • Content and formatting updated to comply with the new standards • All PC transitioned from passive to active voice • Unit title changed to better reflect unit outcomes • Element 1 reworded

Application

This unit describes the skills required to review, coordinate and optimise chemical addition processes and to evaluate and report on system performance and process quality control.

This unit applies to those working as technical staff with a responsibility for optimising chemical addition processes in water, wastewater and stormwater treatment plants and processes.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to, particularly those relating to manufacturer and plant designer specifications, dosing pump capacity and calibration chart.

Those undertaking this unit would work as single operator or as part of a team with some responsibility for team coordination and supervision, depending on the size of the treatment plant. They would perform complex tasks within a familiar context.

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

Competency Field

Treatment

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes	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 of conditions section.
1. Evaluate chemical addition process performance	1.1 Review existing process performance data against relevant organisational and legislative requirements. 1.2 Identify the impact of changing raw or influent water quality on chemical addition processes. 1.3 Identify and coordinate any additional sampling and testing required for valid evaluation of current process performance.
2. Investigate chemical addition plant configuration	2.1 Review existing fault reports and other plant asset information. 2.2 Investigate the operational status of plant components with reference to manufacturer and plant designer specifications. 2.3 Carry out plant configuration investigations to identify potential deficiencies.
3. Investigate chemical options for process optimisation	3.1 Review current chemical addition practices with reference to organisational procedures to identify potential deficiencies. 3.2 Investigate dosing options for current chemicals. 3.3 Identify and investigate new or additional chemicals and related dosing options.
4. Develop and record a plan for process optimisation	4.1 Determine plant configuration or chemical options for process optimisation. 4.2 Plan a trial to test the performance of the determined optimisation options. 4.3 Compile report with recommendations on optimisation options.

Foundation Skills

The foundation skills demands of this unit have been mapped for alignment with the Australian Core Skills Framework (ACSF). The following tables outline the performance levels indicated for successful attainment of the unit.

ACSF levels indicative of performance:

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Learning NA					Reading					Writing					Oral communication					Numeracy				

Performance variables:

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Support					Context					Text complexity					Task complexity				

Further information on ACSF and the foundation skills underpinning this unit can be found in the Foundation Skills Guide on the GSA website.

Unit Mapping Information

This unit supersedes and is equivalent to NWP409A Investigate and plan to optimise the operation of chemical addition processes.

Links

Companion Volume implementation guides are found in VETNet -

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

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Assessment Requirements for NWPTRT011 Assess and improve chemical dosing process

Modification History

Release	Comments
1	These Assessment Requirements were released in NWP Water Training Package release 1.0 and meet the Standards for Training Packages. • Assessment Requirements created drawing upon specified assessment information from superseded unit

Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- conducting investigations and reporting on operational and control system problems
- coordinating sampling and testing including at least one of:
 - jar testing
 - flocculation growth
 - mixing energy
 - UV absorbance
 - pH
 - colour
 - turbidity
 - residual inorganic compounds
 - alkalinity
 - conductivity
- assessing quality of treatment chemicals by conducting a full range of jar tests
- performing mathematical calculations to provide data for the analysis and development of options and solutions
- investigating chemical dosing
- interpreting a range of complex and technical documents, including at least one of:
 - regulatory, legislative, licensing and organisational requirements
 - codes and standards
 - specifications
 - organisational policies

- articulating complex ideas
- analysing and evaluating reports and reference materials
- analysing problems and recommending appropriate remedial solutions
- identifying and responding to risks and hazards
- identifying opportunities for improved water treatment
- reviewing existing process performance with reference to historical data, differences in raw water quality and plant configuration including at least one of:
 - pH
 - turbidity
 - colour
 - presence of algae
 - temperature
- identifying data deficiencies and plan additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of plant components
- investigating current and potential chemical addition practices
- planning trials to test the performance of the determined optimisation options and compiling recommendation reports

Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- the role of chemical addition in water treatment
- the principles of chemical addition, including enhanced coagulation
- chemical addition plant and equipment and system layout including:
 - mixing equipment
 - streaming current detector
 - dosing pumps
 - chemical injection equipment
 - turbidity meter
 - particle counter
 - flow meters
- chemical concepts and reactions relevant to chemical addition processes, including pH and alkalinity
- range and characteristics of chemicals used in chemical addition processes including:
 - polyaluminium chloride (PACL)
 - aluminium sulphate
 - aluminium chlorohydrate (ACH)
 - ferric chloride
 - ferric sulphate

- polyDADMAC
- polyacrylamide
- sulphuric acid
- hydrated lime
- caustic soda
- functions of various chemicals in chemical addition processes
- factors influencing the effectiveness of chemicals in chemical addition processes
- factors affecting the selection of chemicals in chemical addition processes
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- locating chemical dosing points including at least one of:
 - mixing or reaction detention times
 - type of mixer or impeller
- customer expectations and requirements
- dosing pump capacity and calibration chart including:
 - detention times
 - mixing intensity for flash or rapid mixing and flocculation

Assessment Conditions

Consideration must be given to holistic assessment for this unit. Refer to advice in the companion volumes.

Competency should be assessed in an actual workplace or in a simulated environment, with access to equipment and infrastructure appropriate to the outcome. Competency should be demonstrated over time to ensure the candidate is assessed across a variety of situations.

Some components of this unit require assessment in a workplace environment therefore the unit is not suitable for fully external or electronic based assessment.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

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