



Australian Government

NWPHYD003 Develop and maintain ratings

Release: 2

NWPHYD003 Develop and maintain ratings

Modification History

Release 2: Competency Field changed from Hydrology to Hydrometric Monitoring.

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 develop and maintain ratings.

It includes understanding relationships between variables, processes for collecting, interpreting and verifying data and producing compliant reports. It also includes applying relevant legislation, regulations, industry standards and workplace policies and procedures.

This unit applies to water operators involved in the monitoring of all the elements of the water cycle and environmental impacts. Those undertaking this unit would work autonomously, leading staff, while performing complex tasks in a broad range of contexts that could be unpredictable, including remote, confined spaces, working on or near water and working at heights.

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

Pre-requisite Unit

Not applicable.

Competency Field

Hydrometric monitoring

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- | | |
|---|---|
| 1 Review individual measurements | 1.1 Identify monitoring objectives of site and stage discharge ratings requirements |
| | 1.2 Review historical discharge measurements, time series data and stage discharge rating curves and compare against expected trends |
| | 1.3 Use standard processes and software to check, edit and verify field data |
| | 1.4 Analyse, correct and adjust data utilising field measurements and data |
| 2 Develop rating curves | 2.1 Analyse existing measurements to establish trends and compare with existing ratings |
| | 2.2 Identify events at monitoring site that can affect stage discharge curve |
| | 2.3 Identify sources of error in ratings |
| | 2.4 Confirm and verify existing trends whilst developing rating curves |
| | 2.5 Identify and define new trends whilst developing rating curves |
| | 2.6 Develop rating curves in compliance with industry and stakeholder requirements |
| | 2.7 Use theoretical methods to create and extend ratings |
| | 2.8 Document processes and observations to provide traceability and accountability for quality assurance |
| | 2.9 Apply standard formulae to create ratings for pre-calibrated measuring structures |
| | 2.10 Apply quality codes to rating curves utilising workplace procedures and stakeholder requirements |
| 3 Maintain rating curves | 3.1 Confirm accuracy of rating curves using recent measurements and review trends and rating applicability |
| | 3.2 Adjust and maintain rating curves based on new information from data reviews, changed site conditions and additional field data |
| | 3.3 Retrieve and analyse current, historic and trend data |

- using appropriate mathematical techniques
- 3.4 Document processes, observations and adjustments made
- 4 **Report rating curves**
 - 4.1 Prepare and store required archival data to guarantee data security
 - 4.2 Prepare and disseminate ratings according to stakeholder requirements
 - 4.3 Make recommendations for future observations

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.

Unit Mapping Information

This unit replaces and is equivalent to NWPHYD017 Develop and maintain ratings.

Links

Companion Volume implementation guides are found in VETNet -

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

Companion Volume implementation guides are found in VETNet -

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

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for NWPHYD003 Develop and maintain ratings

Modification History

Release 2: Minor document layout changes, no content changes.

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

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:

- applying appropriate quality codes to a rating
- applying mathematical modelling and analytical tools
- applying t-tests to determine whether a new rating is required
- calculating flow rates manually using a set of cross-sections and a long-section
- calculating flow rates through and over structures
- calculating the overall roughness coefficient of a channel consisting of multiple elements
- collecting, storing, archiving and analysing data
- creating ratings including:
 - adjusting gaugings, hydrograph trace and ratings to a common datum
 - checking hydrographic data for correctness and accuracy in preparation for creating ratings
 - creating ratings manually using methods for standard measuring structures
 - developing rating techniques to handle seasonal rating changes
 - identifying and recognising causes of progressive, cyclical and sudden rating changes
 - identifying backwater-affected stations and using techniques to rate them
 - identifying characteristics of ratings appropriate to various cross-section types and flow
 - identifying errors in rating, and incorrect and impossible ratings
 - identifying the possibilities and limitations of scale models for generating ratings
 - using computer systems to create ratings
- drawing an accurate rating by hand
- establishing relationships between variables including stage versus flow and conductivity versus salinity
- estimating channel roughness from photographs
- fitting a rating curve using various mathematical techniques available in relevant software packages
- gathering and interpreting complex documentation and applying it to the development and maintenance of rating curves
- identifying and addressing potential or actual operational problems

- identifying appropriate sections to use for slope-area flow calculations
- identifying gradual stream changes and adopting rating techniques
- identifying gross errors in ratings and the data used to compile them
- identifying short-term rating changes, their causes and means of correctly processing them
- identifying the elements of a stream bed and channel that affect ratings
- identifying, reporting and providing solutions to a range of flow conditions
- interpreting a range of organisational documents
- interpreting and applying technical documentation to the collection, analysis and reporting of hydrometric data
- recording information
- using a spreadsheet to perform calculations
- using graphical logarithmic methods to extend a rating
- using remote work communication systems

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 includes knowledge of:

- basis of statistical goodness of fit tests
- computer software relevant to the analysis and archiving of hydrographic data
- elements of a stream bed and channel that affect the rating
- mathematical and scientific techniques relevant to the analysis of hydrographic data
- relationship between roughness coefficients including Chezy and Manning
- t-tests
- Work Health and Safety procedures

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 suitable workplace operational situations. Where this is not appropriate, assessment must occur in suitable simulated workplace operational situations reflecting actual 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, facilities, equipment and personal protective equipment currently used in industry
- applicable relevant documentation including workplace procedures, industry standards,

equipment specifications, regulations, codes of practice and operation manuals.

Links

Companion Volume implementation guides are found in VETNet -

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

Companion Volume implementation guides are found in VETNet -

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

Companion Volume implementation guides are found in VETNet -

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