



Australian Government

Department of Education, Employment and Workplace Relations

NWP509A Collect, verify and report hydrometric time series data

Revision Number: 2

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Modification History

NWP509A Release 2: Layout adjusted. No changes to content.

NWP509A Release 1: Primary release.

Unit Descriptor

This unit describes the competencies required to compile, analyse and verify data and produce hydrometric data reports to support organisational decision making. An understanding of the processes required to collect data accurately, interpret data, verify data and produce clear reports that conform to organisational standards are essential to performance.

Application of the Unit

This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems.

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 Prepare for collection of data.	1.1 Identify parameters and procedures for collection of <i>hydrometric data</i>. 1.2 Identify client's data and reporting requirements.
2 Retrieve time series data.	2.1 Retrieve and manage data according to organisational procedures. 2.2 Reset data logger according to procedures. 2.3 Apply <i>field verification checks</i> and complete field documentation.
3 Verify hydrometric data.	3.1 Select data to be verified. 3.2 Archive raw data. 3.3 Prepare working copy of data. 3.4 Review <i>verification information</i> to determine trends and identify proposed adjustments to data. 3.5 Use historical data, nearby sites and related parameters to validate data to identify <i>data irregularities</i> and ensure <i>data integrity</i>. 3.6 Use <i>standard processes and software</i> and <i>mathematical and scientific techniques</i> to check, edit, verify, adjust and qualify data. 3.7 <i>Estimate failed periods</i> required by client. 3.8 Document checks and adjustments.
4 Prepare reports.	4.1 Prepare <i>standard reports</i> to check integrity of verified data. 4.2 Prepare <i>client specific reports</i>. 4.3 Prepare verified data, documentation and reports for authorisation. 4.4 File authorised information according to organisation procedures.

Required Skills and Knowledge

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

Required skills:

- communicate technical information and use communication technology with colleagues, management and clients
- assess the performance and limitations of the monitoring systems and sites employed in monitoring the network/catchment
- identify and assess the characteristics of hydrographs and pluviometer traces
- apply analytical tools for hydrometric data
- interpret and apply technical documentation to the collection, analysis and reporting of hydrometric data
- identify and respond effectively to operational problems
- use information and data management computer systems

Required knowledge:

- the hydrometric cycle and its impact on the conditions and objectives of hydrometric time series data management
- measurement methods for collection and checking continuous hydrometric data in the field
- continuous data verification techniques
- mathematical and scientific techniques relevant to the analysis of hydrometric data
- computer software relevant to the analysis and archiving of hydrographic data
- water sampling and testing procedures
- policies and standard operating procedures for data analysis

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 compile, analyse and verify data and produce hydrometric data reports to support organisational decision making including:

- gathering, interpreting complex documentation and applying it to the specification of hydrographic data collection and reporting procedures
- collecting samples accurately
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and resolving potential and actual problems

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
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- 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/or 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 require 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 should only be made 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

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting 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.

Hydrometric data will include:

- water level (streams, lakes)
- rainfall
- groundwater
- soil moisture
- evaporation
- radiation
- wind
- temperature
- EC

Field verification checks will include:

- staff gauge reading
- well tape check
- survey level
- peak level indicators
- flood marks
- rainfall storage and/or calibration check
- EC in-situ meter reading
- groundwater down the casing tape check

Verification information may include:

- station visit information
- operator comments
- photographs
- embedded comments
- secondary checks
- stage:
 - staff gauge
 - peak level indicator
 - flood mark, surveyed water level
 - tape over orifice
 - rainfall collected storage
 - EC in-situ readings
 - laboratory analyses
- related traces - comparison with nearby sites, comparison of variables:
 - stage v rain
 - stage/EC

Data irregularities will include:

- EC v water temperature
- characteristics of continuous traces
- recorder and site:
 - velocity past inlet or orifice
 - datum changes
 - interference and vandalism
 - inadequate recording (log) interval
 - clock irregularities and stoppages
- control:
 - debris on control
 - siltation (of stilling pool)
 - wind
 - stepping
 - weir aeration
 - control interference
 - tailwater
 - leakage
- floatwell systems:
 - lag (ratio of well to inlet diameter)
 - leaking well
 - groundwater inflow to well
 - inlet blockages
 - float catching
 - float line faults
 - friction in float system
 - siltation (of inlets)
- gas purge systems:
 - gas leak
 - gas expiry
 - lag (bubble rate)
 - orifice stability (datum)
 - siltation (of orifice)
- pluviometer:
 - interference and vandalism (extraneous fluid poured into gauge)
 - equipment faults - double counts
 - missed counts
 - storage discrepancy

Data integrity will include:

- parameter relationships:

Standard processes and software may include:

- stage vs stage
- flow vs flow
- rain vs rain
- rain vs stage
- stage vs water quality
- stage:
 - stage / stage (HYPLOTXY) or flow / flow correlation plots
 - double mass curves (HYMASS)
- pluviometer:
 - HYPLOTXY correlation plots
 - double mass curves
- standards relevant to the monitoring network including:
 - AS 3778 for water measurement installations
 - WMO / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
 - best practice methodology where standards are not available or applicable
- software for logical control device programming (maybe system specific or generic software) to automate control, sampling and alarming processes
- water data base management software for triggering alarms, notifications, advice to relevant authorities and management for actions
- procedures for data logging:
 - programming
 - interrogation
 - data downloading
 - data security
- procedures for data processing, storage and presentation:
 - conversion of raw logger file data to channel data in date/time/value format
 - deletion/inclusion/correction
 - quality codes/comments
 - check
 - archive
 - storing ancillary data
 - pluviographs
 - hyetographs
 - hydrographs
 - rating curves

- tables
 - procedures for the measurement of surface slopes and flood slopes
 - procedures for the development, maintenance and extension of rating curves
 - computation of flow from stage data and rating curves
 - software:
 - Kisters - Hydstra
 - Scientific Software Group - AquaChem,
 - Microsoft - Excel
 - web-based development tools for presentation and reporting of data
- Mathematical and scientific techniques** may include:
- logarithmic transformation
 - conversion of units
 - graphical analysis
 - gauging calculations
 - calculation of loads and yields
- Estimated failed periods** will include:
- verification information
 - historical data
 - nearby sites and related parameters
 - copy and paste
 - applying peak stage level or total stored rainfall checks
 - estimation using standard processes and software
- Standard reports** may include:
- daily (HYDAY (stage, max and mean flow rate and flow total, rain
 - monthly (HYMONTH) - transposes (max/min)
 - annual (HYANN)
- Client specific reports** may include:
- flow duration HYFLOW
 - recurrence intervals (Flow: HYLP3 - requires Peak Series to be updated)
 - runoff ratio
 - rainfall intensities
 - web-based presentation tools

Unit Sector(s)

Not applicable.

Competency field

Hydrography.