

Title	Describe processes, process control, and monitoring, in a drinking-water or wastewater treatment plant		
Level	4	Credits	5

Purpose	People credited with this unit standard are able to describe: the types of processes and their relationships, in a drinking-water or wastewater treatment plant; the functions, limitations, and interactions of the constituent parts of drinking-water or wastewater treatment plant process control; the interconnection methods used in process control in a drinking-water or wastewater treatment plant; the function of, and information contained in, piping and instrumentation (P and I) drawings; the purpose and features of Supervisory Control and Data Acquisition (SCADA); and process monitoring and alarms in drinking-water and wastewater treatment plants.
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Classification	Water Industry > Water - Generic
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Available grade	Achieved
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Guidance Information

- Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable legislative and industry requirements.
- Legislation and references relevant to this unit standard include: Water Services Act 2021, Health and Safety at Work Act 2015, Hazardous Substances and New Organisms (HSNO) Act 1996, and subsequent amendments; Ministry of Health, *Drinking-water Standards for New Zealand*, Ministry of Health, Wellington, 2005 (Revised 2018), and subsequent replacements, available at www.taumataarowai.govt.nz.
- Definitions
Industry requirements include manufacturers' specifications; and enterprise requirements which may include documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.
Wastewater may include stormwater and sewage systems.
- Learning and assessment activities for this unit standard must be informed by Te Mana o te Wai (refer to [Taumata Arowai](http://www.taumataarowai.govt.nz)) and the *National Policy Statement for Freshwater Management 2020* available from <https://environment.govt.nz/>.

Outcomes and performance criteria

Outcome 1

Describe the types of processes and their relationships, in a drinking-water or wastewater treatment plant.

Performance criteria

- 1.1 Process chains are described in relation to the drinking-water or wastewater treatment plant.
- 1.2 Automation of processes is described in terms of changes to quality and efficiency.
- 1.3 Circuit types are described in terms of their inputs and outputs.
- Range circuit types include but are not limited to – closed, open, feedback, feed forward.

Outcome 2

Describe the functions, limitations, and interactions of the constituent parts of drinking-water or wastewater treatment plant process control.

Range constituent parts – digital sensors, analog sensors, measuring instruments; measuring instruments – signal processes; dedicated programmable logic controllers (PLCs), actuators.

Performance criteria

- 2.1 The measurement of drinking-water or wastewater treatment plant process control is described in terms of the function and operation of constituent parts.
- 2.2 The constituent parts of drinking-water or wastewater treatment process control are described in terms of their limitations.
- Range accuracy, repeatability.
- 2.3 The constituent parts of drinking-water or wastewater treatment process control are described in terms of the reasons for, and importance of, their calibration.
- 2.4 The constituent parts of drinking-water or wastewater treatment process control are described in terms of their interactions.

Outcome 3

Describe the interconnection methods used in process control in a drinking-water or wastewater treatment plant.

Performance criteria

3.1 Automated process control is described in terms of the interconnection methods used.

Range electric signals – analog, digital; pneumatic signals, hydraulic signals, radio telemetry, fibre optics.

Outcome 4

Describe the function of, and information contained in, P and I drawings.

Performance criteria

4.1 P and I drawings are described in terms of their function, and the information they contain.

Range instrumentation symbols, process lines; electrical, pneumatic, hydraulic, data lines, tags, interconnection references, symbol standards.

Outcome 5

Describe the purpose and features of SCADA.

Performance criteria

5.1 SCADA is described in terms of its purpose and features.

Range features – data acquisition, alarms, plant status, trends, database, set points, reports, networking;
control – automated, manual; operator interface.

Outcome 6

Describe process monitoring and alarms in drinking-water and wastewater treatment plants.

Performance criteria

6.1 Process monitoring is described in terms of treatment outputs.

Range process monitoring purposes, text-based displays, graphics-based displays, alarm display, alarm generation.

6.2 Process alarm generation is described in terms of signal value changes.

Range process variable values, deviations, rates of change.

6.3 Process monitoring equipment is described in terms of hardware and software components.

Range dedicated process monitors, PLCs, proprietary software, SCADA.

Planned review date	31 December 2027
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	19 September 2008	31 December 2018
Review	2	16 March 2017	31 December 2024
Review	3	26 May 2022	N/A

Consent and Moderation Requirements (CMR) reference	0101
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@WaihangaAraRau.nz if you wish to suggest changes to the content of this unit standard.