Title	**Describe and control normal and abnormal process conditions in an energy and chemical plant, and recommend improvements**		
Level	**5**	**Credits**	**30**

Purpose	This unit standard is intended for experienced people working as boiler operators and energy and chemical process operators in an energy and chemical plant. People credited with this unit standard are able to describe: the distributed control system and alarms used; and the control of process conditions to ensure process efficiencies, product quantity and product quality in an energy and chemical plant. They are also able to: control normal process conditions to ensure process efficiencies and product quality; identify and determine implications of abnormal process conditions; respond to abnormal process conditions; review response to abnormal process conditions and identify and recommend improvements, in an energy and chemical plant.

Classification	Energy and Chemical Plant > Operation of Energy and Chemical Plant

Available grade	Achieved

Guidance Information

1 Legislation relevant to this unit standard includes but is not limited to:
- Health and Safety at Work Act 2015;
- Hazardous Substances and New Organisms Act 1996;
- Resource Management Act 1991;

and any subsequent amendments.

2 Definitions

Abnormal process conditions – process deviations outside normal operating parameters which if left to develop will impact on; upstream or downstream processes, the integrity of the plant, product quality, compliance with consents, personnel or plant safety.

Energy and chemical plant may be in – petrochemical, agri-nutrient, power generation, dairy processing, meat processing, and wood fibre manufacturing, or other plants that operate with a combination of high temperatures, pressures, steam and/or chemicals in gas, liquid or solid form.

Organisational requirements – documented policies and procedures. These may include: equipment manufacturers' procedures; plant procedures; suppliers' instructions; site signage; codes of practice; company health and safety plans; on site briefings; and supervisor's instructions. This includes all regulatory and legislative obligations that apply to the plant.
Plant – the operational unit, equipment and/or workplace at which the person is working.

3 For the purposes of assessment:
- evidence for the practical components of this unit standard must be supplied from the workplace.
- evidence for all outcomes must be presented in accordance with organisational requirements.

Outcomes and performance criteria

Outcome 1

Describe the distributed control system, and alarms used in an energy and chemical plant.

Performance criteria

1.1 Describe the distributed control system in terms of its configuration.

Range system includes but is not limited to – operating system, inputs and outputs, backup or redundancy system, integration with other plant systems.

1.2 Describe the control logic used in the distributed control system in terms of purpose and use.

Range evidence of three different examples is required.

1.3 Describe alarms in terms of their types and priorities.

Range alarms include but are not limited to – alarm warning (advisory or critical), alarm tolerance.

Outcome 2

Describe the control of process conditions to ensure process efficiencies, product quantity and product quality in an energy and chemical plant.

Performance criteria

2.1 Describe key performance indicators for process efficiencies, product quantity and product quality for each plant unit.

2.2 Describe consequences of any deviations from each key performance indicator.

2.3 Describe corrective actions for deviations from each key performance indicator.

Outcome 3

Control normal process conditions to ensure process efficiencies and product quality in an energy and chemical plant.

Performance criteria

3.1 Set up current trends and data gathering and analyse and take any corrective actions to minimise variations in critical parameters impacting on process efficiency and product quality.

3.2 Maintain process efficiencies and product quality parameters.

3.3 Meet regulatory and legislative requirements for process operation.

3.4 Complete all plant documentation related to the process and equipment operation.

Outcome 4

Identify and determine implications of abnormal process conditions in an energy and chemical plant.

Performance criteria

4.1 Set up and analyse current trends and data gathering to assist the identification, possible cause(s) and significance of abnormal process conditions.

4.2 Gather information from field operators and include details in the identification and analysis of abnormal process conditions.

4.3 Determine implications of the abnormal process conditions on upstream and downstream operations and communicate to relevant stakeholders.

Outcome 5

Respond to abnormal process conditions in an energy and chemical plant.

Performance criteria

5.1 Review options to respond to abnormal process conditions and select the most appropriate action based on analysis of the information available.

5.2 Communicate the plan of action to the process operations team.

5.3 Implement the plan of action to bring the process into a stable or safe condition.

5.4 Evaluate the status of the process after the response to determine effectiveness and any further actions required.

5.5 Determine any further course of action required based on current process status, and response to actions.

5.6 Communicate progress to relevant stakeholders.

5.7 Implement corrective actions to return the process to a safe condition.

5.8 Complete all plant documentation related to the process and equipment operation.

Outcome 6

Review response to abnormal process conditions and identify and recommend improvements in an energy and chemical plant.

Performance criteria

6.1 Review process data and field information from the response to determine the accuracy of the diagnosis of cause(s) and the effectiveness of the corrective action.

6.2 Identify, recommend, and document improvements that can be made to the response to abnormal conditions.

Range evidence of two improvements is required.

Replacement information	This unit standard was replaced by skill standard 40462.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	24 October 2014	31 December 2022
Review	2	27 February 2020	31 December 2026
Review	3	24 April 2025	31 December 2026

Consent and Moderation Requirements (CMR) reference	0079

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.