Title	**Demonstrate knowledge of and operate a gas turbine in an energy and chemical plant**		
Level	**4**	**Credits**	**20**

Purpose	This unit standard is intended for people working as energy and chemical process operators in an energy and chemical plant. People credited with this unit standard are able to demonstrate knowledge of gas turbines and combustion in the energy and chemical industry; and operational responses to deviations and equipment malfunctions for gas turbines; and operate a gas turbine 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
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.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of gas turbines and combustion in the energy and chemical industry.

Performance criteria

1.1 Describe gas turbines in terms of design, operating principles and operation.

1.2 Describe components of gas turbines in terms of their purpose and operating principles.

Range components include but are not limited to – combustion chamber, igniter, starter, compressor, power turbine, reduction gear.

1.3 Describe auxiliary gas turbine systems in terms of their design and operating principles.

Range auxiliary systems may include but are not limited to – lubrication, cooling, gas fuel system, gas compressor, diesel fuel system, NOx suppression system, sprint water system, starting, anti-icing, fire protection;
evidence of six is required.

1.4 Describe the combustion process in terms of the chemical reaction and the requirement for air.

1.5 Describe gas turbine operating parameters that are impacted by the variations of the fuel supply and quantity used in terms of the operation of the turbine.

1.6 Describe the differences between gas and liquid hydrocarbon fuels in terms of the effect on the combustion process.

Range evidence of two differences is required.

1.7 Describe equipment protection systems for a gas turbine in terms of their purpose and operating principles.

Range equipment protection systems include but are not limited to – trip systems, vibration monitoring, fire protection, pressure protection, surge protection.

Outcome 2

Demonstrate knowledge of operational responses to deviations and equipment malfunctions for gas turbines in an energy and chemical plant.

Performance criteria

2.1 Describe deviations from normal operating parameters that can occur in a gas turbine in terms of the operational steps and techniques used to respond to each deviation.

Range deviations may include but are not limited to – temperature, pressure, flows, vibration levels, fuel usage; evidence of three is required.

2.2 Describe equipment malfunctions that can occur in a gas turbine in terms of the operational steps and techniques used to respond to each equipment malfunction.

Range evidence of three equipment malfunctions is required.

Outcome 3

Operate a gas turbine in an energy and chemical plant.

Performance criteria

3.1 Identify the location of gas turbine components and auxiliary equipment in accordance with organisational requirements.

3.2 Operate the gas turbine using safe work practices in accordance with organisational requirements.

3.3 Operate control systems for a gas turbine and its auxiliary systems in accordance with organisational requirements.

Range control systems may include but are not limited to – gas fuel system, gas compressor, diesel fuel system, NOx suppression system, sprint water system, lubrication, turning gear, cooling, starting, anti-icing, fire protection.

3.4 Carry out checks and routine procedures in accordance with organisational requirements.

3.5 Maintain operating parameters to ensure gas turbine efficiency in accordance with organisational requirements.

3.6 Start up and shut down the gas turbine plant in accordance with organisational requirements.

3.7 Complete all plant documentation related to the process and equipment operation in accordance with organisational requirements.

Replacement information	This unit standard was replaced by skill standard 40454.

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	8 November 1995	31 December 2014
Revision	2	15 December 1998	31 December 2014
Review	3	29 May 2000	31 December 2014
Revision	4	24 July 2002	31 December 2014
Review	5	27 June 2005	31 December 2014
Rollover and Revision	6	25 July 2006	31 December 2014
Review	7	22 May 2009	31 December 2016
Review	8	24 October 2014	31 December 2022
Review	9	27 February 2020	31 December 2026
Review	10	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.