Title	**Demonstrate knowledge of and conduct a sample analysis in an energy and chemical plant laboratory**		
Level	**4**	**Credits**	**6**

Purpose	This unit standard is intended for people working as process operators in an energy and chemical plant. People credited with this unit standard are able to demonstrate knowledge of documentation and equipment used in an energy and chemical plant laboratory. They are also able to: prepare for sample analysis; analyse a sample; reinstate the work area after analysing sample; and calculate and report test results; in an energy and chemical plant laboratory.

Classification	Energy and Chemical Plant > Monitoring of Energy and Chemical Plant

Available grade	Achieved

Guidance Information

1 Legislation and standards relevant to this unit standard include but are not limited to:
- Health and Safety at Work Act 2015;
- Hazardous Substances and New Organisms Act 1996;
- Resource Management Act 1991;
- ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories* available at https://www.iso.org/ISO-IEC-17025-testing-and-calibration-laboratories.html;
- AS LAB C2 *Specific Criteria for Accreditation – Chemical Testing* (IANZ, 2008) available at http://www.ianz.govt.nz;
- *UOP Laboratory Test Methods* (American Society of Test Methods, 2004), available at http://www.astm.org;

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.

IANZ – International Accreditation New Zealand (IANZ) is the accreditation body of the Testing Laboratory Registration Council in New Zealand. It is an autonomous Crown entity established by the Testing Laboratory Registration Council Act, 1972.

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.
Primary data refers to first analysis results.

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

Demonstrate knowledge of documentation and equipment used in an energy and chemical plant laboratory.

Performance criteria

1.1 Locate and describe workplace laboratory equipment in terms of its use.

Range may include but is not limited to – preparation, filtration, crystallisation, precipitation, analysis, measurement; evidence of at least three is required.

1.2 Describe the functions of workplace laboratory equipment.

1.3 Identify documentation and certification for laboratory processing equipment.

Range test certificates, certification, standards for safety, standards for in-service safety inspection and testing of equipment, identification tags, labels, IANZ accreditation.

1.4 Identify equipment status and general documentation.

Range manufacturer's information, equipment operating manuals, safety procedures, operating procedures, maintenance procedures, calibration.

Outcome 2

Prepare for sample analysis in an energy and chemical plant laboratory.

Performance criteria

2.1 Assemble documentation for guidance and recording of the analysis in the work area before the procedure commences.

2.2 Select the area to be used for the analysis in accordance with the factors which could affect the material to be analysed, the process of analysis, and any risks or hazards associated with the procedure.

2.3 Clean the work area and equipment.

2.4 Set up, calibrate, and confirm status of equipment.

2.5 Identify and obtain sample and reagents to be used in the analysis.

2.6 Identify the availability and readiness for use of any related services prior to starting the analysis.

2.7 Check and confirm the sample is representative of the material being analysed.

2.8 Identify actions and responses in the event of abnormal occurrences during analysis.

Range safety data sheets, personal protective equipment, spill containment, emergency response procedures.

Outcome 3

Analyse a sample in an energy and chemical plant laboratory.

Performance criteria

3.1 Identify sample details.

Range origin, time, date.

3.2 Prepare sample for analysis and handle safely.

3.3 Carry out analysis using techniques that minimise risks, hazards, and contamination.

Range Specific Criteria for Sample Analysis, General Requirements for the Competence of Testing and Calibration Laboratories, UOP Laboratory Test Methods.

3.4 Record data relevant to the analysis.

Outcome 4

Reinstate the work area after analysing sample in an energy and chemical plant laboratory.

Performance criteria

4.1 Clean equipment and work area to completely remove all residues and leave equipment ready for re-use.

4.2 Identify, replace, and repair or dispose of equipment that is worn or damaged.

4.3 Label and store substances used.

4.4 Label and dispose of sample waste.

Outcome 5

Calculate and report test results in an energy and chemical plant laboratory.

Performance criteria

5.1 Correct primary data as required.

5.2 Calculate results from primary data to the required accuracy.

5.3 Investigate any deviations from the expected range of results and take actions to resolve them.

5.4 Compile a written report of all relevant information.

5.5 Report the outcomes of analysis.

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	6 February 1997	31 December 2018
Revision	2	3 August 2000	31 December 2018
Review	3	20 September 2002	31 December 2018
Review	4	20 February 2009	31 December 2018
Rollover and Revision	5	20 April 2017	31 December 2022
Review	6	27 February 2020	31 December 2026
Review	7	30 January 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.