

Title	Shut for maintenance and restart a chlorine-based chemical plant in pulp manufacturing		
Level	5	Credits	20

Purpose	People credited with this unit standard are able to: demonstrate knowledge of the chlorine-based chemical plant operations; prepare the chemical plant for maintenance; and restart the chemical plant after maintenance.
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Classification	Wood Fibre Manufacturing > Pulp and Paper - Chemical Plants
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Available grade	Achieved
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Prerequisites	Critical health and safety prerequisites: Unit 21493, <i>Manufacture sodium hydroxide and chlorine products for pulp bleaching</i> , and Unit 21457, <i>Isolate and reinstate a section of energy and chemical plant</i> ; or demonstrate equivalent knowledge and skills.
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Guidance Information

1 Definition

Worksite documentation refers to instructions to staff on policy and procedures (including the application of legislation to worksite situations) which are formally documented, and are available for reference at the worksite. Examples are standard operating procedures, specifications, manuals, and manufacturer's information.

2 The following apply to the performance of all outcomes of this unit standard:

- a All work practices must meet recognised codes of practice and documented worksite health and safety and environmental procedures (where these exceed code) for personal, product, and worksite health and safety, and must meet the obligations required under current legislation, including the Health and Safety in Employment Act 1992, the Resource Management Act 1991, the Hazardous Substances and New Organisms Act 1996, and their subsequent amendments.
- b All work practices must meet documented worksite operating procedures. This includes the recording (by electronic or non-electronic means) of activities, events, and decisions.
- c All communications made in relation to this unit standard must be made in accordance with worksite procedures for content, recipient, timing, and method.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of the chlorine-based chemical plant operations.

Performance criteria

- 1.1 Procedures for starting up and shutting down the chemical plant are explained in accordance with worksite documentation.
- 1.2 Chemical plant isolation procedures for plant maintenance are described in accordance with worksite documentation.
- Range isolations for – anolyte system, catholyte system, nitrogen purge system, electrolysers, hydrogen handling system, chlorine handling system, rectifier, transformer, hydraulic pressure system.
- 1.3 Hazards associated with emptying out, isolating, and refilling the chemical plant are identified and actions to be taken to isolate, minimise, or eliminate the hazard are described in accordance with worksite documentation.
- Range hazards may include but are not limited to – electricity, personal safety, explosions, gas leaks, chemical spillage.
- 1.4 Consequences of non-conformance with worksite operating procedures are described in accordance with worksite documentation.

Outcome 2

Prepare the chemical plant for maintenance.

Range chemical plant may include but is not limited to – anolyte system, catholyte system, nitrogen purge system, electrolysers, hydrogen handling system, chlorine handling system, rectifier, transformer, hydraulic pressure system.

Performance criteria

- 2.1 Safe work practices associated with shutting down the chemical plant are identified and used in accordance with worksite documentation and legislative requirements.
- Range practices may include but are not limited to – plant entry procedures, isolation procedures, lock-outs, interlock systems, emergency stops, machine guarding, wearing appropriate safety equipment.
- 2.2 Checks ensure that other upstream and downstream processing stages are prepared for the shutdown process to commence.

- 2.3 Shutdown procedures are completed in accordance with worksite documentation.
- 2.4 Environmental considerations are managed and met in accordance with worksite documentation and legislative requirements.
- 2.5 Washing of chemical plant is completed to meet engineering requirements and in accordance with worksite documentation.
- 2.6 Isolation of the chemical plant is completed and checked in accordance with worksite documentation.

Outcome 3

Restart the chemical plant after maintenance.

Performance criteria

- 3.1 De-isolation procedures are completed in accordance with worksite documentation and legislative requirements.
- 3.2 Chemical plant is pressure and leakage tested in accordance with worksite documentation.

Range may include but is not limited to – anolyte system, catholyte system, electrolysers, hydrogen handling system, chlorine handling system.
- 3.3 Chemical plant is filled, chemical flows are established, and current is applied in accordance with worksite documentation.
- 3.4 Monitoring of pressures, temperatures, chemical concentrations, flows, voltage, pH, and tank levels determines the endpoint of the start-up process.
- 3.5 Continuous chemical generation operations are established in accordance with worksite documentation.
- 3.6 Operating and equipment faults and malfunctions are identified, and corrective action is taken, in accordance with worksite documentation.

Range equipment faults and malfunctions – electrical, mechanical, hydraulic, instrumentation, distributed control system, programmable logic control system.
- 3.7 Production, maintenance, and quality records are explained and completed in accordance with worksite documentation.

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	18 December 2006	31 December 2025
Review	2	24 October 2014	31 December 2025
Review	3	30 November 2023	31 December 2025

Consent and Moderation Requirements (CMR) reference

0173

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