RESOURCE DEVELOPMENT
CONSULTANTS

MSP ENGINEERING PTY LTD

TLK LHPP1 PROJECT

PROJECT NO. 11312

PROCESS DESCRIPTION

DOCUMENT NO. 11312-0000-U-SP-001

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Appendix A - PROCESS FLOW DIAGRAMS

1.0 INTRODUCTION

This process description provides a detailed description of the unit processes within the Lithium Hydroxide Processing Plant (LHPP) and should be read in conjunction with the documents below (see Table 1).

Table 1: Relevant documentation for the Lithium Hydroxide Processing Plant

Document Name	Document Number
Process Flow Diagrams	
Piping & Instrumentation Diagrams	11312-0100-P-PID-001 to 11312-4270-P-PID-003
Process Design Criteria	11312-0000-U-DC-002
Mass Balance	11312-0000-U-MB-003
Functional Specifications	11312-0000-I-SP-001 to 11312-4160-I-SP-001

2.0 PROCESS OVERVIEW

The process areas within the Lithium Hydroxide Processing Plant (LHPP) are grouped into two general areas: pyro-metallurgical (pyro) and hydro-metallurgical (hydro) operations.

The pyro operations include a spodumene feed system, preheating of the spodumene feed, calcination, calcinated spodumene cooling, milling, acid roasting, and acid roasted product cooling.

The hydro operations include leaching, neutralisation, impurity removal, evaporation, lithium hydroxide reaction, sodium sulphate deca-hydrate (Glauber's salt) removal, sodium sulphate crystallisation, drying and packaging, and finally lithium hydroxide crystallisation, drying and packaging.

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3.34 Area 4110 – Cooling Towers

Refer to process flow diagram.

Cooling water is provided by two Cooling Towers and cooling water distribution circuits. Cooling Tower 1 (4110-CT-001A/B) is dedicated to the pyro area while the Cooling Tower 2 (4110-CT-002A/B) services the hydro area. Each Cooling Tower consists of two cooling cells each with its own evaporative fan, allowingfor cell isolation. Cooling Tower 1 consists of Cooling Tower 1A/B (two cells) and Cooling Tower 1 Fans (4110-FN-001A/B). Cooling Tower 2 consists of Cooling Tower 2 A/B (Two cells) and Cooling Tower 2 Fans (4110-FN-002A/B).

Water from Cooling Tower 1 is delivered to the Calcine Cooler (1220-RC -001) and the Acid Roast Cooler (1320-RC-001) via Cooling Tower 1 Supply Pumps (4110-PP-001A/B). Water delivered to the Calcine Cooler (1220-RC-001) is collected in the Calcine Cooler Water Recirculation Tank (1220-TK-002) and pumped back to the Cooling Tower by Calcine Cooler Water Recirculation Pumps (1220-PP-002A/B). Water delivered to the acid roast cooler is collected in the Acid Roast Cooler Water Recirculation Tank (1320-TK-001) and pumped back to the Cooling Tower by Acid Roast Cooler Water Recirculation Pumps (1320-PP-001A/B). Returned water is then cooled to the required process temperature for distribution throughout the plant. Cooling tower 1 is located in a bund and the cooling tower 1 sump.

Cooling Tower 2 supplies water to the users in the hydro area. The main users are electromagnets, crystallisation heat exchangers, heat exchangers for condensate, and heat exchangers in the LiOH dryer area. The circuit operates as a ring main with water delivered from the cooling towers by the Cooling Tower 2 Supply Pumps (4110-PP-002A/B) and returning in a closed loop.

Both Cooling Tower 1 and 2 are equipped with level and conductivity measurement to ensure that operation is stable, with blowdown of water carried out automatically at high conductivity. Blowdown water is directed to the Waste Water Tank (4130-TK-001).

Primary make-up water to cooling tower 1 is KWRP water with the option to add storm water when available. The primary make-up to cooling tower 2 is KWRP water for start-up followed by the demin plant waste water and the option for adding storm water when available.

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3.36 Area 4130 – Waste Water Tank

Refer to process flow diagram.

The Waste Water Tank (4130-TK-001) collects water from various locations around the plant for disposal to a waste water treatment facility.

Main inputs to the waste water tank are blowdown water from the two sets of Cooling Towers and blowdown from the boilers.

Stage Two waste water will flow into the Stage One waste tank and be pumped to waste water treatment plant via Waste Water Pumps (4130-PP-003A/B).

Waste water is pumped to the client's treatment facility using Waste Water Pumps (4130-PP-001A/B) for further treatment.

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3.38 Area 4150 – Compressed Air

Refer to process flow diagram.

Three Air Compressors (4150-CP-001A/B/C) provide air for the compressed air network. Two compressors are on-line with one compressor off-line as a standby. The on-line compressors are capable of supplying the demand of instrument and plant air systems. The system is designed for automatic change-over of compressors and automatic line routing such that any of the three compressors can be routed to the instrument or plant air system.

Instrument air is routed to the Instrument Air Receiver (4150-VE-001) and then through a moisture trap and an oil/water filter before entering the Instrument Air Dryer (4150-DR-001). The Instrument Air Dryer is a desiccant type dryer consisting of two dryer vessels loaded with desiccant. Air passes through the online unit while the offline unit is in regeneration. The Dryer unit has an integrated PLC that facilitates the operation of the unit. An External Chiller (4150-RF-001) unit supplies chilled water for cooling duty. Air then passes through a set of dust filters before entering the distribution network.

Note:

The Compressed Air system (Area 4250) in LHPP2 will be identical to the Compressed Air system (Area 4150) in LHPP1, however the plant air and instrument air ring main on the main pipe rack will connect Area 4150 LHPP1 and Area 4250 LHPP2 to form a combined ring main for both compressed air services.

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APPENDIX A

PROCESS FLOW DIAGRAMS