

LUPIN MINE
APPLICATION FOR RENEWAL AND AMENDMENT OF LICENCE 2AM-LUP1520
FINAL CLOSURE AND RECLAMATION PLAN



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NWB Technical Meeting
June 6, 2019
Kugluktuk, Nunavut



Lupin Mine - Status



Lupin Mine - Status

- Located approximately 285 kilometres southeast of Kugluktuk, in the Kitikmeot Region of Nunavut; accessible by air and winter ice road
 - In operation from 1982 to 2005, the Lupin Mine has been in Care and Maintenance since February 2005
 - Owned by Lupin Mines Incorporate (LMI), a wholly owned indirect subsidiary of Mandalay Resources Corporation
 - Interim Closure and Restoration Plan submitted by LMI and approved by the Nunavut Water Board July 20, 2018
- Translation

Lupin Mine - Status

- LMI has carried out progressive reclamation under this and previously approved plans since initial ownership of the property in 2011 (through Elgin Mining and now Mandalay Resources Corporation)
 - Final Closure and Reclamation Plan (FCRP) was submitted for approval July 27, 2018 with an application for licence amendment and renewal
 - LMI provided notice on January 30, 2019 to Environment Climate Change Canada, with respect to the Metal and Diamond Mines Effluent Regulations, seeking closed mine status.
 - The Application and FCRP completeness check and technical review have been completed.
- Translation

Water Licence 2AM-LUP1520 Renewal and Amendment

Application Highlights

- Request a licence term of 7 years to coincide with full closure activities followed by 5 years of post-closure monitoring
- An increase in water use from the current 5,000 m³/year to 685 m³/day for 2 years to cover increased camp requirements and industrial use, then return to 5,000 m³/year during post-closure
- Review of Licence terms and conditions, and structure to better represent the closure of the mine, non-operations, and post-closure monitoring
- Approval of the 2018 Final Closure and Reclamation Plan

■ Translation

Lupin Mine - Status

- Satellite view of the Lupin Mine Site



Lupin Mine - Closure

- Draft concept of the Lupin Mine site after reclamation is complete

Sara – Norwest to provide

Lupin Mine – Final Closure and Reclamation Plan

Components of the Plan

- Executive Summary
- 1.0 Introduction
- 2.0 Project Description
- 3.0 Progressive Reclamation and Post Operational Activities
- **4.0 Permanent Closure and Reclamation**
- 5.0 Monitoring
- 6.0 Post Remediation Site and Environmental Conditions
- 7.0 Financial Security
- 8.0 References

Components of the Plan

- Translation
- 1.0
- 2.0
- 3.0
- **4.0**
- 5.0
- 6.0
- 7.0
- 8.0

4.0 Permanent Closure and Reclamation

Progressive Reclamation Update and Final Closure Requirements

- Underground Mine
- Tailings Impoundment
- Rock Pile
- Chemicals/Soil
- Buildings and Equipment
- Capital Expenditures and Short Term Water Treatment/Management
- Interim Care and Maintenance
- Post Closure Monitoring and Maintenance
- Mobilization/Demobilization

Progressive Reclamation Update and Final Closure Requirements

- Translation

Final Closure Requirements

- **Underground Mine**
- **Translation**
- Tailings Impoundment
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Underground Mine

- Portal and mine openings closure (shaft, air raises)
- Crown Pillar blasting; for soil, waste rock and demolition waste disposal
- Backfill and reclaim open stopes (Crown Pillars)

- Translation



Centre zone crown pillar opening



Portal

Underground Mine



East zone crown
reclaimed 2002

Final Closure Requirements

- Underground Mine
 - **Tailings Impoundment**
 - Rock Pile
 - Chemicals/Soil
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 - Mobilization/Demobilization
- Copy/paste from slide 11, highlight where needed.

Tailings Impoundment

- Rip Rap; MDam Completed 2017
 - Flatten Slopes Pond 2 side of MDam
 - Cover Tailings; approx. 199,000m² to be completed - 10,500 m² of cover applied to Cell 5 in 2018, remaining cover required of 199,000 m².
 - Tailings piping removal/disposal - 4,000 m of tailings pipeline removed, 4,500m remaining
 - Syphon removal/disposal (Dam 1a and JDam)
 - Construct/excavate spillways for Dam 1a and JDam (including geotextile and rip rap relocated from dam slopes)
 - Specialized Items (permanent instrumentation, monitoring)
- Translation

Tailings Impoundment



Tailings Impoundment

TCA Cell 5 on left, Pond 2 on right



Cell 3 and 4

Cell 5 to be covered,
view from MDam



Tailings Impoundment



Dam 1a syphons, spillway location

KDam; Pond 2 on right



Final Closure Requirements

- Underground Mine
 - Tailings Impoundment
 - **Rock Pile**
 - Chemicals/Soil
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Rock Pile

- Consolidate Rock into Central Area (191,000m³)
- Soil Cover - excavate, haul, spread and compact (303,400m³)
- Contour area of rock left in place (303,400m²)

Crown pillar area



Waste rock and piles - ballfield

Final Closure Requirements

- Underground Mine
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 - **Chemicals/Soil**
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Chemicals/soil

Buildings

Decontamination/Consolidation of Hazardous Materials

Translation

- Decontaminate: oil, fuel and glycol systems – a large amount of this work was carried during the 2018 summer and winter work program – all tanks not in use outside of the main tank have been cleaned and signed off by a professional engineer
- Removal of asbestos containing materials (sheet flooring, tiles, mastic and caulking)

Chemicals/soil

Hazardous Materials Removal

Translation

- Waste oils, fuels, batteries, machine shop paints/solvents etc. – the majority of waste has already been removed from site (2015, 2016, 2017 and 2018), batteries have been removed. Lab reagents have been removed in (2016, 2017 and 2018). Items currently at site will be required during reclamation

Contaminated soils and soils removal

- Load haul dump to crown pillar

Final Closure Requirements

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Buildings and Equipment

Removal of buildings

- Accommodation complex
- Hoist room and travel ways
- Shaft house
- Warehouse, Mill
- Powerhouse
- Headframe
- Airlock building and fresh air intake
- Two cold storage buildings
- Arsenic Treatment building
- Pumphouse
- Explosives Storage
- Fire house

Removal of buildings

- Translation slide

Buildings and Equipment

Removal of buildings

- Emergency powerhouse
- Weather station/storage buildings
- Batch plant, ATV building
- Storage at laydown/airstrip
- Fuel Tanks (12 small, 15 large remain)
- Freshwater intake
- Consolidate & dump boneyard debris
- Break foundation slabs/leave in place

Removal of buildings

- Translation slide

Buildings and Equipment

Removal of buildings



Headframe



Warehouse,
engineering
offices and shops



Main Fuel Farm



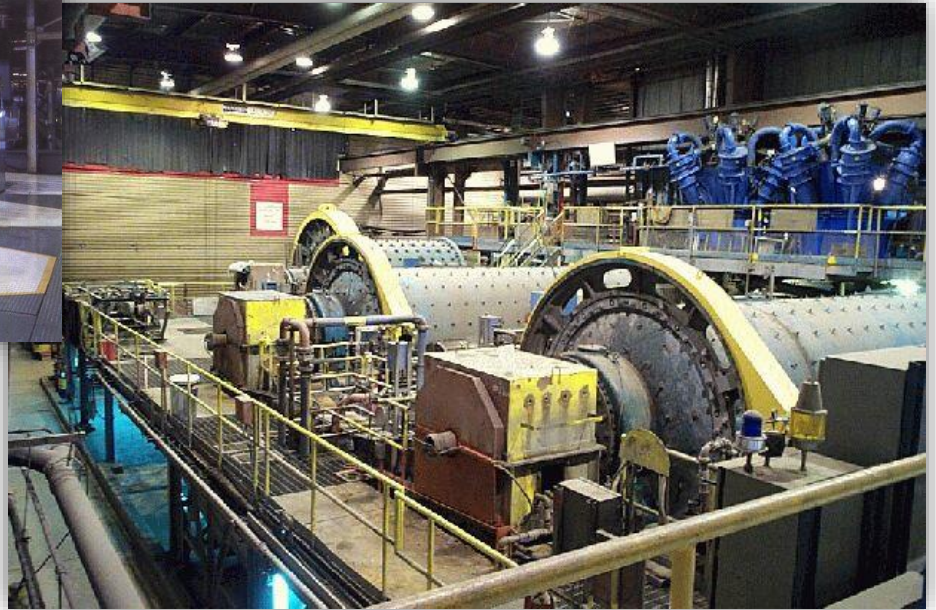
Mill

Buildings and Equipment

Removal of equipment



Powerhouse



Mill

Buildings and Equipment (cont.)

- Landfill for Demolition Waste
- Reclaim approx. 12km of roads (removal of culverts, scarify roads)
- Other – grade and contour esker borrow area (180,000m²)



Tailings access road

Fingers Lake Esker



Final Closure Requirements

- Underground Mine
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 - **Capital Expenditures and Short Term Water Treatment/Management**
 - Interim Care and Maintenance
 - Post Closure Monitoring and Maintenance
 - Mobilization/Demobilization
- Copy/paste from slide 11, highlight where needed.

Capital Expenditures and Short Term Water Treatment/Management

- Decommission fresh water supply (pumphouse and pipeline)
- Water treatment operation tailings containment area (1.8mil m³)



Fresh water pumphouse and 6" line

TCA Pond 2 – Syphon and
Spillway location centre left



Final Closure Requirements (following reclamation)

- Underground Mine
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 - **Interim Care and Maintenance**
 - Post Closure Monitoring and Maintenance
 - Mobilization/Demobilization
- Copy/paste from slide 11, highlight where needed.

2019 - Final Year of Interim Care and Maintenance

- Water management and sampling
 - Geotechnical Assessment
 - Final EEM Study – final program to be carried out during 2019
 - HHERA to be completed – report to be finalized Oct 2019
- Translation slide

Final Closure Requirements (following reclamation)

- Underground Mine
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 - Interim Care and Maintenance
 - **Post Closure Monitoring and Maintenance**
 - Mobilization/Demobilization
- Copy/paste from slide 11, highlight where needed.

Post Closure Monitoring and Maintenance (10yr)

- Annual geotechnical inspections
- Monitoring (including maintenance)
- Site water quality monitoring (water licence)
- Translation slide

Final Closure Requirements (following reclamation)

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 - **Mobilization/Demobilization**
- Copy/paste from slide 11, highlight where needed.

Mobilization/Demobilization

- Additional equipment mobilized to site early 2020
- Tools and equipment
- Transport/flights
- Man days/months
- Accommodations for workers
- Translation slide

- Lupin Project (Circa 1978)



Proposed Lupin Mine site; viewing south with sewage lakes near top of photo

Lupin Mine - Closure

- Draft concept of the Lupin Mine site after reclamation is complete

Sara – Norwest to provide

Work Programs – 2019-2022

- Mandalay Resources completed an RFP process in 2018 and have an agreement in place with the successful bidder, Nahanni Construction Ltd.
 - Due to delays in security refunds and permits (winter road) LMI will be in care and maintenance during the 2019 season. Some additional reclamation will also be carried out during the 2019 season by Nahanni.
 - Mandalay anticipates having the final closure and reclamation plan/renewed and amended water licence process completed in the first quarter of 2020.
- Translation slide

Work Programs – 2019-2022

- Mobilization will start in early 2020 via the winter ice road
 - The full reclamation program, as updated during the NWB final closure and reclamation process (located on the NWB ftp site), will take place during 2020 and 2021. With demobilization taking place in the first quarter of 2022.
- Translation slide

Technical Meeting – Discussion Topics

- Closure timelines
 - Tailings Impoundment Area
 - Water Quality
 - Closure configuration; tailings cover and design, dam stability and dam enhancement, spillways and natural drainage, use of rip-rap, additional cover materials, etc.
 - newly exposed tailings
 - Mine site; cover specification
- Translation slide

Technical Meeting – Discussion Topics (cont.)

- Geochemical Characterization
 - Acid Rock Drainage assessment
 - Potentially Acid Generating waste rock
 - Geochemical Modeling, thermal and seepage modeling
- Translation slide
- Human Health Ecological Risk Assessment
- Post Closure Monitoring
 - Post closure monitoring plan
- Climate change consideration
- Cost estimating and security requirements

Contact Information

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■ Translation slide

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