

FACT SHEET / 2020

LISHEEN – WORLD LEADING MINING CLOSURE



IN SUMMARY



First zinc and lead mine in Ireland to be granted an Integrated Pollution Control License



Lisheen Mine has demonstrated that it has successfully addressed all areas that may have been at risk of causing environmental pollution on the site.



Mine site being developed into a national bio-economy campus

€4.6m

of funding has been awarded to develop a pilot National Bio-economy Campus on the Lisheen site.

“THE DEVELOPMENT OF A CAMPUS FOR THE RESEARCH AND PRODUCTION OF BIOCHEMICALS WILL BE A FIRST AND WILL BE A FLAGSHIP FOR THE MINING INDUSTRY.”

Among the world’s finest examples of environmentally sensitive mine closure and rehabilitation.

Mining and milling activity at the Lisheen Mine in Ireland was concluded at the end of 2015 after 17 years of operation.

The cessation of mining and processing at Lisheen was not the end of the story as far as VZL was concerned – what has followed is a world class closure which is currently being successfully executed.

The Lisheen Closure Rehabilitation and Aftercare Management Plan (CRAMP) is believed to be among the world’s finest examples of environmentally sensitive mine closure and rehabilitation.

The Closure Plan, implemented to fully address regulatory authority permit requirements and to meet Vedanta’s legal and moral obligations, focuses on both the physical closure and remediation of the site, as well as its ongoing aftercare.

The plan was developed over many years and approved by the relevant Irish authorities. Lisheen and Vedanta used both their in-house expertise and international experts on mining and mine closure from around the world.

CLOSURE TIMELINE



ACTIVE MINE CLOSURE

April 2014 – February 2018



PASSIVE MINE CLOSURE

February 2018 – December 2019



AFTERCARE

January 2020 – March 2050 (planned)

LOCATION OF OPERATION



LISHEEN MINE

Latitude: 52° 44' 31.19" N
Longitude: -7° 40' 14.39" W



CONSOLIDATED TIMELINE



ACTIVE MINE CLOSURE

April 2014 – February 2018



PASSIVE MINE CLOSURE

December 2019 – March 2020 (Planned)



AFTERCARE

April 2020 – March 2050 (planned)

2009

- Progressive rehabilitation begins

2015

- Active implementation of closure plan

2016

- Underground decommission
- September – Complete drainage works on lands in consultation with local farmers
- October – Decommission of mine site (Tepee, backfill, plant and associated elements)

2017

- August – Clean up rehabilitation validation by Tobin Consulting Engineers. Exit Audit (Ireland Environmental Protection Authority)
- September – Completion of physical works on active closure

2018

- February – Decommission of mine site (All other areas)
- September – Glanbia pilot project fully operational
- October – Bio-economy Ireland day held at Lisheen
- December – Migration into after care
- Complete final phase of TMF rehabilitation works

Tailings management facility rehabilitation and restoration



2005



2014



2016



2019

Timeline of tailings management and rehabilitation

Active Closure

Goals achieved included:



Completion of active closure physical works



Tailings Management Facility rehabilitated (capped)



Water table fully recovered



All obsolete infrastructure removed



All contaminated ground remediated



Creating a space that will be attractive to other industries



Support of Lisheen staff during the closure by upskilling, provision of training grants and redeployment at other Vedanta operations



Lisheen's employees who no longer have work at the closed mine have been offered suitable positions at alternative Vedanta operations around the world. The Lisheen team has established a new company, Lisheen Technical and Mining Services (LTMS) to provide Vedanta, and the industry as a whole, mining and technical consultancy services

Environmental Performance

Lisheen is committed to mitigating and minimising our environmental footprint from mine closure and beyond.

Lisheen was the first zinc and lead mine in Ireland to be granted an Integrated Pollution Control License in 1997 and is currently on its fourth revision, P0008-04. The licence is governed by the Environmental Protection Agency (EPA) and Lisheen is subject to audits by Ireland's this agency against all conditions.

- There are no actions outstanding with the EPA.
- All required reports have been submitted and all required actions have been completed.

"Lisheen is committed to mitigating and minimising our environmental footprint from mine closure and beyond"



Rehabilitated site and surrounds

Passive Closure

Lisheen Mine has demonstrated that it has successfully addressed all areas (i.e. buildings, plant and equipment, workings, waste, soil, materials etc.) that may have been at risk of causing environmental pollution on the site. The validation of this clean-up and rehabilitation work has been conducted and completed by external consultants, Tobin Consulting Engineers, between August and December 2017.

The validation process indicated that all hydrocarbon and metal concentrations in soil were below guidelines values, with the average lead and zinc concentrations at 70 mg/kg and 302 mg/kg respectively (Table 1).



"These results demonstrate the efficiency of works completed during the rehabilitation project."

Table 1: Pre and Post rehabilitation results

		Zinc	Lead
Pre-rehabilitation Risk Assessment	Average Results	28,315	4,827
	95%ile	113,700	17,370
Post-rehabilitation Validation results	Average Results	302	70
	95%ile	1,100	203

Additionally, two Exit Audits were carried out by Ireland's Environmental Protection Authority (EPA) on 9 August 2017 and 23 November 2018. These two reports are independent verification of the exceptionally high standards of the Lisheen rehabilitation process.

Lisheen mine

CLOSURE SUCCESS CRITERIA



No	Description	Objective	Target date for completion	Progress
1	Mine Site Decommissioning	<p>Full decommissioning and disassembly of the Tepee, Processing plant, Backfill plant and all associated elements.</p> <p>Follow control measures in place to prevent unwanted incidents.</p> <p>Return footprint to concrete base level.</p>	Oct-2016	<div><div></div></div> 100%
2	Mine Site Decommissioning (all other areas)	<p>Full decommissioning or demolition of unusable site structures and return footprint to suitable lands for provision for alternative industry.</p> <p>Follow control measures in place to prevent unwanted incidents.</p> <p>All holes / pits and other openings are to be securely capped, filled or otherwise made safe.</p> <p>Access to members of the public will be restricted as appropriate to site conditions.</p> <p>Buried services removed as required.</p>	Feb-2018	<div><div></div></div> 100%
3	Underground Decommissioning	Before an area is rendered inaccessible, all hazardous material must be removed and the sign off sheet must be signed off in full and accepted by the Environmental Coordinator.	2016	<div><div></div></div> 100%
4	Plugging Vent Shafts	<p>Plug / seal mine portal to prevent access to the Mine.</p> <p>Plug / seal all vertical shafts and rehabilitate to surrounding ground level.</p>	2016	<div><div></div></div> 100%
5	Life of Mine Backfill	Complete all required backfill underground (including any surface top up), to minimise surface subsidence.	2015	<div><div></div></div> 100%
6	Dry Closure of TMF	<p>Rehabilitate and restore entire TMF surface to agricultural grassland.</p> <p>Installation of a 700mm rock cap and 300mm growth medium layer.</p>	Sep-2018	<div><div></div></div> 100%
7	Management of TMF Water Treatment & discharge	<p>Design and construct three spillways from the TMF.</p> <p>Provision of Water treatment – Dosing of TMF discharge with NaOH to allow precipitated material to settle in condition ponds.</p> <p>Design and construction of stilling box and wetland.</p>	2017	<div><div></div></div> 100%

The Lisheen Mine closure strategy is underpinned by a set of success criteria, which are used as a framework for validation of restoration performance. The criteria are specific, measurable, achievable, realistic and time related and are used as indicators to determine whether closure objectives have been met.



No	Description	Objective	Target date for completion	Progress
8	TMF management into perpetuity	Form a strategy for the long term custodianship of the Site / TMF and associated IPCL.	Jan-2018	<div><div></div></div> 100%
9	Carrick Hill Restoration	Rehabilitate Carrick Hill Borrow Pit as per Planning conditions.	2017	<div><div></div></div> 100%
10	Land Holdings	Demolition of existing structures on Lisheen Land Holdings.	2016	<div><div></div></div> 100%
		Remedial work to existing structures on Lisheen Land Holdings.	Dec-2018	<div><div></div></div> 100%
11	Restoration of Ground water	Restoration of water level to baseline conditions.	2019	<div><div></div></div> 100%
		Transfer Group Water Scheme to full ownership/ management by Monye Group Water Scheme (MGWS) committee.	Jun-2018	<div><div></div></div> 100%
		Installation of Groundwater monitoring wells.	2016	<div><div></div></div> 100%
12	Maintain an appropriate level in the Rossestown River	Augment river, if required.	2020	<div><div></div></div> 100%
		Provision of clean ground water for blending, if required.		
13	Port of Cork	Render safe or remove for disposal or recovery, any soil, subsoil, plant or equipment, or any waste, materials or substances that may result in environmental pollution. Follow control measures in place to prevent unwanted incidents.	Mar-2017	<div><div></div></div> 100%
14	Completion of any required remediation on rivers	Develop plan with Inland Fisheries Ireland.	2016	<div><div></div></div> 100%
		Implement plan with Inland Fisheries Ireland.	2016	<div><div></div></div> 100%
		Complete risk assessment of sediment in Rivers and carry out appropriate works if required.	Feb-2018	<div><div></div></div> 100%
		Complete drainage works on lands in consultation with local farmers (to prepare for return to baseline ground water levels in the region).	Sep-2016	<div><div></div></div> 100%
15	Obtain mine closure completion certificate	Confirmation that the Regulatory Authorities are satisfied that the success criteria has been met and that there are no remaining environmental liabilities remaining on site.	Dec-2018	<div><div></div></div> 95%

NEXT STEPS

Going forward, key focus areas include:



STEP 1: IPC Licence Reduction

December 2019

With the completion of the site clean-up and rehabilitation, along with the validation reports from Tobin Consulting Engineers and the two satisfactory EPA exit audits, Lisheen is satisfied that the condition of the site and subsoil in Stages 1 and 2 is in a satisfactory state and is not causing, or likely to cause, environmental pollution.

Lisheen Mine owns c. 1,200 acres and this land is subject to the conditions of the Lisheen Mines Integrated Pollution Control Licence, as issued by the EPA. The IPCL licence only applies to the area within a defined licence boundary. As of July 2018, the conditions of the Lisheen IPCL apply to the full Lisheen land holding.

Therefore, on the completion of mining, Lisheen applied to reduce the licensed boundary to the footprint of the tailings dam.



STEP 2: Aftercare Programme

Due to commence January 2020

The programme is predominately associated with monitoring and assurance reporting to demonstrate that the site is not having any impact on the environment. Aftercare monitoring will proceed as set out in the Aftercare programme.



STEP 3: Mine Closure Completion Certificate

March 2020

Lisheen Mine has reached a state where mining lease ownership can be relinquished.

In order to provide the information required by the Statutory Authorities to issue a MCCC, Lisheen mine has drafted an 'AS BUILT' CRAMP Report, which documents the works that were carried out to implement the work programme set out in the approved CRAMP document.



Future developments

The Lisheen Mine site is being redeveloped into the National Bio-economy Campus.

€4.6m
of funding
has been
awarded

by Enterprise Ireland to the Irish Bio-economy Foundation to develop a pilot facility on the Lisheen site.

Glanbia Ingredients Ireland have achieved planning permission for a plant. The GLI project is part of a major European funded project called AgriChemWhey.

These and other important circular economy projects have been earmarked for the Lisheen site. The Lisheen Mine site is mentioned in Ireland's National Policy on the Bio-economy.

* AgriChemWhey is a consortium comprising of partners and member states including Glanbia that converts dairy by-products into high value bio-based chemicals.



Long-term stewardship

2009

Progressive rehabilitation begins

December 2015

Operation ceases and ongoing closure planning begins
Progressive rehabilitation begins

September 2017

Completion of active closure (physical works) expected – to be followed by passive closure (validation of works)

2018

Migration into aftercare (30-year monitoring programme) begins – brought forward from 2020 due to rapid recovery of groundwater

April 2018

AgriChemWhey project plans to locate at Lisheen. The project will explore the development of a new state-of-the-art, bio-refinery that will valorise the lactose produce in the dairy industry to produce lactic acid and polylactic acid (PLA) a key component of biodegradable plastics.



Land for repurposing

June 2019

Glanbia achieve planning permission for AgriChemWhey facility

September 2018

Glanbia – Pilot facility operational at Lisheen



Lisheen land repurposed

Aerial view of Lisheen mine operation before rehabilitation began

Milestones

in the redevelopment of Lisheen

1

Lisheen at centre of Ireland's EU Model Demonstrator Region for the bio-economy.

2

Formation of the Irish Bio-economy Foundation (IBF) – headquartered at Lisheen.

3

Enterprise Ireland awards €4.6M to the IBF to develop a Piloting Innovation and Research Facility for the bio-economy.

4

AgriChemWhey project plans to locate at Lisheen.

5

Pilot facility operational at Lisheen.

6

Glanbia achieve planning permission for facility.

Alternative industrial use

While surface and underground rehabilitation has been in progress, Lisheen has actively collaborated with local authorities and business development groups in finding possible users for a site that is well served by power, water and waste disposal infrastructure. Our vision is of a bio-economy campus powered by the wind turbines that dot the neighbouring landscape – an area of natural beauty.

Lisheen is extremely pleased with the progress that has been made in this regard. A number of companies are advanced in the plans to develop their business on the Lisheen site and this saw further investment in late 2017 when €4.6million in government aid was secured by the Irish Bio-economy Foundation to convert the Lisheen administration building into a pilot plant. This will be a first for Ireland and will be a strategically important development for Ireland's burgeoning bio-economy.

While there are some limited examples worldwide where mine sites have been repurposed for alternative use after mining has ceased, the development of a campus for the research and production of biochemicals will be a first and will be a flagship for the mining industry to be able to demonstrate the sustainability of mining and how value can be derived even after the mineral resource has been exhausted.



People of Lisheen



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