Dr Michael Green
Growth company & Resources analyst
DOC Investments Limited
Kemp House,
152 City Road,
London EC1V 2NX
doc@docinvest.co.uk

Project report
Development of a polymetallic tailings project in Tasmania

Key data
Metals: lead, zinc, copper, gold & silver.
Aggregate revenue: A$1.3bn'
Annual EBITDA: US$42m'
Mine life: 10 years
' – company estimates

CPR
NPV(10): US$113.2m
IRR: 90.94%

Website
www.nqminerals.com

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Gold polymetallic tailings project with substantial reserves and compelling economics soon to be in production

Impressive infrastructure & high-grade tailings. NQ Minerals' (NQ) acquisition of the Hellyer Gold Mine in 2017 bears all the hallmarks of being a company-making deal. These polymetallic tailings represent substantial reserves of high-grade zinc, lead, copper, silver and gold. In addition, impressive infrastructure is already in place which has meant that the company can bring this tailing reprocessing project on stream with attractively low and affordable capital expenditure.

Unlocking the value within Hellyer's tailings. Early-2018 saw the start of the 7-month refurbishment program. Truth is the company had a team on site for the past 12 months to painstakingly inspect all the mill and the infrastructure to prepare a detailed plan for the systematic refurbishment of the operations. The real key to unlocking the value at the Hellyer is the mineral processing and so NQ has been involved in extensive lab tests to resolve an issue that has foxed previous owners. This has led to some subtle changes in the existing equipment in the mill as the now finalised flowsheet for the Hellyer circuit is being projected into the plant.

Highly profitable production set to begin shortly. The CPR in November 2017 outlined a project with 9.25 Mt of reserves with a 10 year life of mine and determined an NPV(10) of US$113.2m with an IRR of 90.94%. Since that time zinc and lead prices have climbed significantly, so this valuation now looks low. Production from the tailings treatment project is expected to begin in 4Q 2018 and is estimated to generate an annual EBITDA of US$42m (£30m) for ten years.

Option over nearby high-grade VMS deposits. In ten years' time, NQ will have an empty tailings pond and available plant capacity. Looking ahead, the board has their eyes set on the enviable potential of nearby high-grade VMS deposits as Hellyer is located within the Mount Read volcanics. This mineralised belt is the well-known home to a substantial amount of profitable polymetallic production at mines such as: Hercules, Que River, Roseberry and Mount Lyell.

Sound foundation to build on. The tailings project provides a solid basis on which to build a leading gold & base metal production, development and exploration company. Today investors are witnessing the birth of such an entity. Few small cap companies ever make such a large-scale acquisition, but the management has been able to use the enviable cash generation potential of this project to attract debt finance for most of the acquisition cost as well as the re-start capex which limits dilution for shareholders. At the same time, investors don't have to suffer the seven-year wait required to permit and construct a new mine.

INTRODUCTION

The 100%-owned Hellyer Gold Polymetallic Tailings Project in Tasmania, Australia is NQ Minerals Plc's (NQ) flagship project. The Hellyer Mine is located in NW Tasmania 80 kilometres south of the port of Burnie. These tailings represent substantial reserves of zinc, lead, silver, gold and copper which result from the mining of the very rich polymetallic Hellyer Gold Mine in the 1990s.

NQ acquired the Hellyer Gold Mine in June 2017 and along with the tailings, the assets included a large pre-existing mill facility and full supporting infrastructure which provides access to a direct rail line to the port. The company holds consolidated granted mining leases CML103M/1987 for an area which contains the tailings dam and the associated processing plant.

Annual US$42m EBITDA for 10 years

Production of concentrates is scheduled to begin in 4Q 2018. This acquisition will turn NQ into a substantial producer and generate an annual EBITDA of US$42 million (£30 million) for a total of ten years. Beyond that time there is the opportunity to use the capacity of the mill and tailings dams to take advantage of other similar high grade polymetallic VMS deposits within this highly prospective area.

Hellyer Gold Polymetallic Tailings Project

BACKGROUND

World class underground mine

Mine development commenced in 1987 at the world class Hellyer underground mine on the West Coast of Tasmania under the ownership of Aberfoyle. Production began in 1989 following the commissioning of the concentrator and the Hellyer deposit was mined by underground methods for lead, zinc, copper, gold and silver until 2000.

Subsequently, there were two brief periods of further activity. Firstly, between 2006-08 when the tailings were partially dredged by Polymetals Group. Secondly, during the years 2010-12 when there was mining by Bass Metals of the Fossey deposit which extends down plunge from the Hellyer deposit.

Tailings from the mill in 1989-2000 were deposited in a depression one kilometre away and the area flooded to prevent oxidation of the sulphides. Later on, in the years between 2010 and 2012 the tailings were partially dredged by Polymetals and retreated. At this time, the reprocessed tailings were deposited in the Shale Pit and Western Arm. Whilst, tailings from processed Fossey deposit were also discharged into the Western Arm.

Permit for tailings reprocessing granted

NQ completed the purchase of the Hellyer Gold Mine in June 2017 with its associated tailings retreatment project. The acquisition cost was £22.1 million (A$20 million plus shares equivalent to a then 29.9% stake in NQ) with some of the vendors joining the board including Roger Jackson. Following the acquisition, the final permitting for tailings reprocessing was granted in October 2017 and in February 2018, the company commenced the program of refurbishment.

Significant source of world base and precious metals

Productive mineralised belt

9.25Mt resource of high-grade tailings

GEOLOGY

The Hellyer deposit is a volcanic polymetallic massive sulphide (VMS) deposit that lies within the Mount Read volcanic arc of western Tasmania. The Mount Read volcanics are a Cambrian volcanic belt which has become complex due to folding, faulting and events associated with plate tectonics.

VMS ore deposits are a type of metal sulphide ore deposit which mainly tend to be copper-zinc resulting from volcanic-associated hydrothermal events at the sea bed. Such ore deposits occur within volcanic rocks and were formed around the same time. Today, VMS ore deposits are a significant source of the world's copper, zinc, lead, gold and silver ores with by-products can include: cobalt, tin, barium, sulphur, selenium, manganese, cadmium, indium, bismuth, tellurium and gallium.

At Hellyer, the VMS deposit is a well-developed alteration zone and stringer vein system. The mineralisation is sulphide hosted and mainly comprised of pyrite, with lesser sphalerite, galena and arsenopyrite. There are both base metal sulphide zones and distinct areas of strong base metal veins called stringer zones, which are largely found on the footwall of the main part of the Hellyer deposit that has been mined. The Hellyer stringer zone contains thick synmineralisation veins which essentially are the channels that the hydrothermal solutions used to pass up through the alteration zone to the sea floor. The metal zoning seen at Hellyer, does highlight the presence of several feeder systems that underlie the deposit.

The Mount Read volcanics represent a productive mineralised belt that has profitable polymetallic production. The region has seen extensive historical mining and hosts similar deposits which include Hercules Mine (lead, zinc, copper, silver & gold), Que River (zinc, copper, lead, gold & silver), Roseberry (zinc, lead, copper & gold), Mount Lyell (copper) and the Henty Gold Mines. Plus, there are many smaller sites of prospective mineralisation along the West Coast Range.

RESERVES

The tailings are held within four separate areas and at the time of the acquisition were deemed to contain a total 11.24Mt. The Competent Person Report (CPR) was published in November 2017 which outlined a project with highly robust economics. The CPR also provided a positive review of mine design, environment, permitting and metallurgy issues.

Hellyer Tailings Storage Facility MRE (CPR 20-11-17)						
JORC Classification	**Gross total & Net Attributable to NQ Minerals**					
	Tonnage Mt	**Zinc %**	**Lead %**	**Silver g/t**	**Gold g/t**	**Copper %**
Measured	2.05	3.31	3.35	94	2.63	0.2
Indicated	5.99	2.29	2.95	93	2.55	0.18
Inferred	1.21	1.00	2.60	86	2.57	0.19
Total	**9.25**	**2.35**	**2.99**	**92**	**2.57**	**0.19**
	Tonnage Mt	**Zinc (t)**	**Lead (t)**	**Silver (Moz)**	**Gold (oz)**	**Copper (t)**
Measured	2.05	67,900	68,700	6.195	173,300	4,100
Indicated	5.99	137,200	176,700	17.910	491,000	10,800
Inferred	1.21	12,100	31,500	3.345	100,000	2,300
Total	**9.25**	**217,400**	**276,600**	**27.360**	**764,300**	**17,600**

The CPR valuation was based on a Mineral Resource Estimate (MRE) and an Ore Reserve Estimate alongside the economics. The MRE showed a resource of 9.25Mt with gold at 2.57g/t for 764,300 ounces, silver at 92g/t for 27.36Moz, zinc at 2,35% for 217,400t, lead at 2.99% for 276,600t.

1.2Mtpa capacity

PRODUCTION

There is excellent infrastructure and a mill at Hellyer which were constructed to process material from the previous mining operations. Following the refurbishment program, production of the first concentrate is scheduled to begin in 4Q 2018. The mill is planned to be working at a higher level of concentrate production than in the past which has necessitated the upgrading the capacity of the filter presses to 1.2Mtpa. The initial level of production is likely to represent 50% of full capacity, while the recovery is finely tuned ahead of increasing the throughput. The early months should see production rise from 50% of full capacity to 75%, 90% and 100%.

Location of assets within NQ's CML103M/1987 licence area at Hellyer

Optimising project economics

Daily production records from the past clearly show the quality of the material that went into the tailings dams, and MRE in the CPR seems to quite closely match these past records. The MRE was based on the results of around a hundred holes that were drilled into the tailings. Armed with this data, the team has designed a mine plan which sees the dredge excavating the highest quality tailings early on to optimise the economics of the project.

Planned annual production of concentrate products		
Concentrate product	**Annual production**	**Shipping destination for smelting**
Lead	36.2ktpa @ 36% lead, 2.7% zinc, 850g/t silver and 6.9g/t gold.	South East Asia
Zinc	28.6ktpa @ 46% zinc, 2.3% lead, 160g/t silver and 1.8g/t gold.	Hobart, Tasmania
Precious metals/pyrite	553ktpa @ 48% sulphur, 64g/t silver and 2.8g/t gold.	China

High-grade tailings will be processed on site in the mill to produce three marketable concentrates with the residual going to storage. These valuable concentrates are to be transported from the project's own railhead to the Port of Burnie for shipping to various smelters for final processing.

Systematic refurbishment

Key to unlocking value

REFUBISHMENT PROCESS

The seven-month refurbishment program began in early-2018 and production is expected to start in 4Q 2018. Actually, the company enjoyed a real head start as over the preceding twelve months, NQ had good access to the project and put a small team of experts on site to make a thorough analysis of the operations and prepare a detailed plan for the systematic refurbishment of the operations.

Hellyer Mill

The Hellyer Gold Mine came with impressive infrastructure and a decent mill which had processed material from the previous mining operations. The mill is a 1.6Mtpa flotation plant equipped with a semi-autogenous grinding (SAG) mill, ball mills and floatation cells. It was constructed in 1988 and still is a very good mill today. When built, the mill was a state-of-the-art plant and fully automated which means that the control system allows the plant to work on a 24 hour a day shift system manned by a total team of just 50.

The mill is now being moved to operational readiness with a 7-month refurbishment program. The real key to unlocking the value at the Hellyer is the mineral processing technology and so NQ been involved in extensive metallurgical lab test work. The flowsheet for the Hellyer circuit has been completed in the laboratory and is now being projected into the plant.

Currently a team of up to 40 people are working on site and the hard commissioning is scheduled to be completed in the next few months. The critical path is the refurbishment of the filter presses and the subsequent 30-day commissioning period. Other long lead time components such as additional storage tanks and the overhaul of the dredge are well advanced.

Thickeners

SAG mill and ball mill

Work is proceeding well on the refurbishing the ball mill, flotation area, reagents and the thickeners & dewatering systems. Also, being refurbished is the extensive infrastructure including an undercover concentrator loading station provides direct access to an 80km railway to the port where there is housing, handling and loading facilities for the concentrates. To ensure the project runs smoothly the management team includes key members who used to run Hellyer in the past which includes ex-Senior Metallurgists.

A$1.3+ billion aggregate revenue

ECONOMICS

The 10-year plan for the permitted Hellyer project has the prospect of short-term cash flow. Over its mine life, the project is estimated to provide revenues in excess of A$1.3 billion which is expected to deliver strong cash flow and profitability coupled with a quick payback of capital to maximise shareholder value.

The CPR published in November 2017 outlined a project revealing compelling economics with an NPV(10) of US$113.2 million (US$128.4 million excluding acquisition costs) and an IRR of 90.94% (197% excluding the acquisition cost). Importantly, this NPV(10) valuation in the CPR was calculated using much lower zinc and lead prices then are prevalent today.

In terms of gold equivalent, the production costs are around $600 an ounce, so there is a gross margin of 50% plus. Certainly, the project is economically robust as the zinc price could halve, and the operation would still remain profitable. Over the current 10-year life the project, that aggregate revenue of over A$1.3 billion (US$1bn) is expected to result in an estimated annual EBITDA of US$42 million (£30 million).

Low start-up capex of £11.25m

As the 1.6mtpa fully automated flotation plant and extensive infrastructure is already in place, this means that the start-up capital expenditure to get the project into production is attractively low by industry standards at £11.25 million. Stretching out into the future is a long-term earnings stream of large and reliable revenue, cash flow and profits from the Hellyer tailings projects. Such strong project economics have encouraged lenders to provide debt finance to cover most of the acquisition cost along with the necessary start-up capital expenditure. This way of financing has served to limit dilution for shareholders.

Today's computer processing speeds and big data provide the technology to be gain updated information from this fully automated mill every 15 milliseconds. Phase 2 of the work envisaged at the mill will see the sensors and instrumentation installed which will allow such data can be harnessed for subsequent upside in recovery factors of 2-4%, which could generate a big return on the required investment.

PROJECT PIPELINE

Option over nearby high-grade VMs deposits

At the end of this ten-year period, NQ will have the capacity in the mill and the tailings dams to take similar high grade polymetallic VMS deposits in the area and might not have to look that far for its next project. NQ already has the option over nearby high-grade VMS deposits. Apparently, lying beneath the mill are some amazing potential prospects, with apparently very high grade.

It has to be pointed out that the Hellyer Mine over its 11-year operational life produced 15Mt of ore that yielded 610,000t of bulk concentrate, 2.7Mt of zinc concentrate and 728,000 tonnes of lead concentrate. Hellyer was an extremely high-grade mine with combined zinc and lead grades of a jaw-dropping 20%. Exploration in the nearby area could pay dividends as has been proven over the years, the best place to find a new mine is often next to an old one.

Certainly, the Mount Read volcanic arc has been a significant producer of base metals in the twentieth century hosting five major deposits with an accumulated total of more than 350Mt of ore. All the VMS deposits in this area are capped which makes them hard to find, but electrical methods (resistivity, induced polarisation, electromagnetics etc) are highly effective in identifying such targets because they respond to the electrical conductivity of the rocks and minerals.

Company-making acquisition

STRATEGY FOR GROWTH

The Hellyer Gold Polymetallic Tailings Project represents a low-risk world-class project with a clear path to short-term revenue generation, a positive cash flow and profitability. The tailings represent substantial high-grade reserves of zinc, lead, silver, gold and copper resulting from previous mining. Due to substantial existing infrastructure and resources, the initial capex required to restart production is attractively low by industry standards. This acquisition will allow NQ to become a substantial producer over the next twelve months.

The CPR determined a valuation of NPV(10) of US$113.2m for the project with an IRR of 90.94%. This valuation was based on much lower zinc and lead prices that current prices. The zinc price could halve, and the operation would remain profitable which serves to illustrate just how robust the economics are. Aggregate revenue is estimated to be over A$1.3bn with an estimated annual EBITDA of US$42m (£30m) for 10 years.

This could just be the start of the new story that is being unveiled at Hellyer as in ten years' time there will be a further opportunity to use the capacity of the mill and tailings dams to take advantage of other similar high grade polymetallic VMS deposits. There is the very real possibility of additional potential beyond that time as Hellyer lies within the Mount Read volcanics belt which is a highly prospective area and the home to extensive profitable polymetallic production.

There is no doubt that the acquisition of the Hellyer Gold Mine was a company-making deal. Being the re-start of an existing project means that cash flow and profits can be achieved a lot quicker than the seven years it would probably take to permit and construct a new mine. But, the truth is that few small caps acquire a project of this sort of scale. Certainly, the Hellyer Gold Polymetallic Tailings Project has the real potential to catapult NQ towards its goal of becoming a leading gold and base metal production, development and exploration company.

About the author

Dr Michael Green is an independent analyst who specialising in growth companies and resources companies. He gained a BSc and PhD in Mining Engineering from Nottingham University. Having been involved in consultancy work, he began working in the London financial market in the 1980s as a Resources Analyst with stockbrokers Buckmaster & Moore and then HSBC-owned Greenwell Montagu Securities. Subsequently, he was involved in analysing a wide range of growth companies and became Head of Research at stockbroker Everett Financial which specialised in the small cap market. Since, 2006 Michael has been an independent analyst. UK-based DOC Investments Ltd provides research and investor relations.