

**RL APPLICATIONS FOR FLOW – ON TITLES FROM  
EL 10/2000 MONARCH FLATS AND EL 12/2000 PIONEER  
NORTH EAST TASMANIA**

**FOR VAN DIEMAN MINES PTY LTD**

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## **RL APPLICATIONS FOR FLOW-ON TITLES FROM ELS 10/2000 MONARCH FLATS AND 12/2000 PIONEER, NE TASMANIA**

### **1.0 INTRODUCTION**

ELs 10, 11 and 12/2000 were applied for by Mineral Holdings Australia Pty Ltd on 5<sup>th</sup> May 2000 and granted on December 2000. They were subsequently transferred to Van Dieman Mines Pty Ltd under an option agreement exercised on 18<sup>th</sup> June 2004.

The licences were selected to allow exploration of the alluvial, heavy mineral resources particularly cassiterite, ilmenite, rutile, zircon, monazite, tantalite and gold. Gemstones particularly sapphire are an essential part of the evaluation.

Each licence covers an area of 4 sq km in NE Tasmania (Plan 1) and secures the residual resources in the former alluvial tin mines at Monarch, Endurance and Pioneer.

Desk and field studies of the three deposits over the five years to 2005 have enabled a modern evaluation and recalculation of the remaining resources allowing for pre-stripping the barren overburden resulting in an increase in the grade and volume of the recoverable alluvial resources.

The three exploration licences will reach their expiry date on 8<sup>th</sup> December 2005. Evaluation has progressed to a stage which has encouraged the company to apply for flow-on titles. EL 11/2000 South Mt Cameron will be replaced by ML 14M/2004 designed to take the Endurance deposit to production. To the north of Gladstone, the Scotia deposit is proceeding to production under ML 15M/2000 which has already been granted. This application seeks to have Retention Licences awarded over the Monarch deposit (EL 10/2000) and the Pioneer deposit (EL 12/2000).

Van Dieman Mines believes that, having regard to its capitalization and debt financing, that it should concentrate on the two MLs at Endurance and Scotia to bring them into production with a resultant cash flow. With a planned 2 years mine life at Endurance, the company can then move onto phasing Pioneer and Monarch into production. Until that time, the company seeks to hold these deposits as Retention Licences while still pursuing studies to bring them up to mining standard.

These areas are an integral part of Van Dieman Mines Ringarooma Project of North Eastern Tasmania which consolidates all of the potential alluvial tin resources in the region and will allow exploration and production to proceed in a coherent manner and with subsequent economies of scale.

### **2.0 PREVIOUS EXPLORATION**

Exploration activities by Mineral Holdings Australia Pty Ltd on these licences in Years 1-3 are featured in the annual reports (Duncan, 2001, 2002 and 2003). The Monarch deposit was bulk sampled and alluvial resources were recalculated at all three deposits leaving out barren overburden. These studies were carried out by Niugini Resources Ltd and are lodged in a series of reports in Mineral Resources

Tasmania (Kinnane, August 2001, December 2001, December 2002, and September 2003).

Years 4 and 5 involved the capturing by Van Dieman Mines of all exploration and resource drilling and grade analyses into a GIS for evaluation of the deposits and presentation in the company prospectus which successfully led to capital raising by the company on the London AIM (VDM Prospectus, October 2004).

### 3.0 EXPENDITURE

Total exploration expenditure for the duration of the licences to 30<sup>th</sup> June 2005 amounts to the following-

EL 10/2000	Monarch	\$85,252
EL 11/2000	Sth Mt Cameron	\$151,221
EL 12/2000	Pioneer	\$152,728

Apart from Monarch, all of the work mainly involved desk studies, field inspections and GPS surveying and there was no surface disturbance and no need for rehabilitation. At Monarch following bulk testing, rehabilitation was carried out according to the Exploration Code of Practice.

### 4.0 RESOURCE INVENTORY

Modern resource figures have been calculated by Niugini Resources Pty Ltd following extensive study of the previous mining and exploration history of the alluvial tin deposits. The study involves the metrification of the old imperial data, the use of modern computer software, the capture of the data into a GIS, the elimination of the barren overburden in the calculations and an appreciation of the geological setting of the deposits. The detailed figures and their basis are contained in the five project reports already lodged in the Department as cited in the Reference section of this application. Relevant details of the resources from previous reports and from the VDM Prospectus are contained in the Appendix.

### 5.0 MONARCH- EL 10/2000

Tin was first discovered at Monarch in the late 1800s and most initial work was carried out by Chinese miners.

The main mining phase was 1923 to 1935 when 71.5 tons of concentrate were recorded for the duration.

Subsequently, the most important evaluations on the resources including drilling were carried out by BHP (1964), Austminex (1965), BMI in the early 1970s and Amdex in the early 1980s. Test pitting by MHA in June 2001 confirmed the general tenor of the resource in B Lens and allowed estimates of the grades of the accessory minerals zircon, rutile, ilmenite and monazite.

Recent recalculations of the resource by Niugini Resources Pty Ltd (Kinnane, August, 2001) involving the removal of the barren overburden increases average grades by a factor of three and gives-

**An Indicated Mineral Resource- A, B and E Lens (at a cut off grade of 200g/BCM) of-**

**556,751 bank cubic metres (BCM) at an average grade of 1,220g/BCM of 70% Sn concentrate to give 679 tonnes of 70% Sn concentrate-**

- **with the estimated accessories of 19g/BCM of zircon as ZrO<sub>2</sub> and 48g/BCM of rutile or ilmenite as TiO<sub>2</sub>.**

**A fourth lens "D" has the capacity to contribute an additional 8.2 tonnes of concentrate.**

**Overburden to ore ratios are about 3.5 to 1.**

**The Monarch ore reserve estimation sheets are reproduced in the Appendix to this report.**

The resource blocks including most of "E" Lens are open to the southeast where they escape off the present mineral tenements towards the lower slopes of Mt Cameron with the promise of more alluvials (Plans 2,3 and 4).

The main cassiterite deposits are arranged in a thin basal alluvial wash horizon of coarse sands, grits and conglomerates of granite derivation plus occasional clasts and blocks of Meta? Sandstone resting immediately on a decomposed granite bedrock. The deposits also contain zircon, monazite, ilmenite, rutile and corundum. The basal mineralized zone is overlain by barren, granite-derived clayey sands and sandy clays.

The tin deposits are thought to be Tertiary fluvial deposits derived from Mt Cameron with NW - trending elongate lenses parallel to the present drainage and perhaps modified to the north and west by a marine transgression.

### **5.1 Mining Strategy and Feasibility**

Mining logistics are excellent at Monarch with all weather roads and mains power already as close as several kilometers to the north along the Gladstone-Bridport Road (Plan 4).

Previous mining techniques involved hydraulic monitors, gravel pumps and sluice boxes. BMI introduced a dragline. All methods used to date have resulted in high losses of tin by the failure to remove the barren sticky clay from the treatment circuit and by basement dilution.

The use of modern gravity circuits and mining excavators is expected to improve recoveries of cassiterite and the accessory heavy minerals and sapphire (Kinnane, internal memo).

Only preliminary feasibility studies have been carried out on this deposit.

On the above resource figures and taking the current price of tin metal to be A\$6,000 per tonne the insitu value of the Monarch deposit would be about \$A2,850,000 making no allowance for the accessory heavy minerals or sapphires.

Based on a number of mining techniques such as a single bucket ladder, an overburden stripping and smaller dredge, a double ladder dredge and backhoe mining, the operating costs would be around A\$1.68, \$1.59, \$1.40-1.50 and \$1.44-2.22/cu m respectively.

Kinnane (internal memo) has suggested using other methods such as stripping overburden using scrapers, bulldozers or large hydraulic excavators and mining using conventional backhoe, trucks or gravel pumps or the removal of overburden by dragline and mining of wash by conventional methods. Preliminary estimates suggest that running a 100 cu m/hour alluvial plant with backhoe, bulldozer and jig based gravity plants would cost from \$2.50- \$ 10.00/cu m depending on a number of variables such as overburden to ore ratios, grade, water and labour availability, location, access and infrastructure.

In a specific case, Kinnane has calculated that for a two dredge or pre-stripping operation, the estimated cost would be \$1.70/cu m. It is also expected that similar costs and surplus figures could be achieved using a "dry mining" method. More recently, the estimate of a current dredge operator using modern technology advocated the possibility of getting the costs down close to \$1.00/cu m (Kinnane, pers com).

An appropriate treatment plant circuit is featured in Plan 12 and recognizes the complex assemblage of accessory heavy minerals including gold, sapphire, ilmenite, rutile, zircon and tantalite which substantially increase the value per cubic metre of the alluvial deposits. Preliminary costs suggest an amount of A\$1.25M for the plant although the availability of a second hand plant would reduce this figure substantially.

The treatment plant would be mobile and could either be on site or at a central locality depending on the other sites being mined in the Ringarooma Tin Project.

Environmentally, the old tin mining areas have been disturbed and degraded by operations in the past. However, any new mining operations will have to be subject to the modern planning and environmental provisions. Mineral Resources Tasmania has carried out erosion control and other rehabilitation measures in the area and the mining plan would recognise and preserve these remediation features as far as possible.

A Retention Licence of 4 sq km is required to secure the resource so that VDM can carry out the following-

- convert all old data to modern metric, AMG and digital format,
- commence a full economic assessment of the resource including the value of the accessory minerals,

- complete a pre-mining feasibility study involving mining technique, processing methods and environmental considerations, and
- complete marketing studies and allow time for the metal prices.

## **6.0 PIONEER- EL 12/2000**

Tin was discovered in the Pioneer district by William Bradshaw in 1877 where the present Ringarooma River cut and reworked the Pioneer lead.

A company was formed in 1882 to work the shallow deposits but was not successful and Chinese miners worked on tribute until the late 1890s when their efforts revealed the rich Pioneer deep lead to the west.

The Pioneer Tin Mining Company was restarted in 1900 and carried out the main production of tin concentrates with hydro-electification from 1909 until 1929 when the workings were inundated by the Great Ringarooma Flood. In that period, 9,360 tonnes of tin concentrates were developed from nearly 11 million cu m of wash.

During 1930-46, tributers worked the mine for the Endurance Tin Mining Company which had bought out the Pioneer Company and moved most of the plant to their South Mt Cameron Mine eventually abandoning the Pioneer leases.

In 1967 to 1976, Vern Woods worked the Pioneer initially with sluice boxes and then with a modern jig plant. The Pioneer operations were then acquired by Triako and Buka operating as Kibuka Mines and their associate Amdex Mining continued mining the lead westward.

Total production from the Pioneer Lead up to that time stands at 10,554 tonnes of tin concentrates. The operations ceased in late 1979 following the collapse of the world tin price and the introduction of production quotas. However, before closing the mine, Amdex had carried out an extensive drilling program mainly on the western and southern flanks of the open pit and it is this valuable program which has allowed the recent reassessments of the residual tin resources by Kinnane (December, 2002 and September, 2003) both reports already being in the Department.

The Pioneer Project has undergone further re-assessment and a new resource calculated (VDM Prospectus). Each drill hole in the unmined sections of the deposit was reviewed and all grades above 200g SnO<sub>2</sub>/bcm cut-offs for the wash zone only included in the new resource base.

**The Measured Mineral Resource on the above basis is-**

**4,616,000 BCM with an average grade of 872g/BCM containing 4,025 tonnes of SnO<sub>2</sub> concentrate.**

**A stripping ratio of 4.9:1 is estimated with overburden of 22.73M BCM.**

Possible resource extensions occur both within the current tenement outlines and also outside to the west and down palaeoslope towards the centre of the South Mt Cameron basin (Plans 9 and 10). These extensions potentially contain 3.5M cu m at an average grade of 1,000g/cu m of SnO<sub>2</sub> or some 3,500 tonnes of SnO<sub>2</sub> concentrates.

The Pioneer alluvial tin deposits are the best documented in the northeast due to the geological work by Morrison (1980) carried out shortly after the end of mining operations when the pits were still fresh, free from vegetation regrowth and unflooded.

The Tertiary stratigraphy of the deposit revealed in the open cut consisted of two sequences-

- an upper (overburden) sequence, some 30-40m thick of trough cross-bedded sands and granules and large bodies of kaolinite clay, and
- a lower, 6m thick cassiterite-bearing sequence of stratified gravels, tabular cross-bedded sands and gravels, trough cross bedded granules and lenticular bodies of peat and clay.

Reconstruction of the basement topography in the mine area reveals a channel trending north west down palaeoslope. The best cassiterite grades are restricted to this channel and the deposit appears to terminate downstream although the coarse basal gravels are said to persist. This possibility requires further drill investigation.

The geological setting is interpreted as a proximal, braided stream depositional environment with the heavy minerals concentrated in longitudinal bars, transverse bars and channel facies. The bulk of the heavy mineral deposition is thought to take place during the initial stages of waning flow after flooding. The clasts in the basal gravels are mainly cleaved sandstone (63%) and quartzite (23%) with minor quartz (5%), massive sandstone (4%), clay (2%), shale (2%), wacke (0.5%) and conglomerate (0.5%). The source of the sediments was to the east of Pioneer. The origin of the cassiterite is thought to be greisen mineralization such as present in the Anchor Mine on Blue Tier.

The age of the deposit is quite well constrained with pollen from peat units, as lateral facies equivalents of the tin-bearing gravels, being shown to be Late Oligocene- Early Miocene or about 20M years (plus or minus 5M). Both pollens and leaves indicate a temperate rain forest environment. Wood fragments, partially lignitised, are preserved in the gravels adjacent to the peat deposits.

Morrison (1989) went on to classify the major alluvial tin deposits of the Ringarooma Valley- the Arba, Valley, Briseis, Pioneer and Endurance as late Oligocene braidplain deposits. Deposits occupying narrow, sinuous channels north and west of Mt Cameron (Scotia, Lochaber and Scoloch?) were probably older (Eocene). Terrace deposits of the present Ringarooma and Great Musselroe Rivers were probably younger at post – middle Miocene.

## 6.1 Mining Strategy and Feasibility

Infrastructure and access such as sealed roads, power and water are excellent with the deposit lying adjacent to Pioneer Township (plan 10, Kinnane, December 2002). An old treatment shed and stockpiles are present close to the township but a new mining operation would require a more remote plant site to minimize noise and dust and other adverse impact on the community.

On the above resource figures and taking the current price of tin metal to be A\$6,000 per tonne, the in-situ value of the Pioneer deposit would be about A\$17M making no allowance for the accessory minerals or sapphires. These accessory minerals have been partially quantified in other deposits in the region of similar mineralogical derivation and could be present in grades in the range 50-200g/ cu m for rutile, ilmenite and zircon; up to 10mg/cu m for gold and rare earths and tantalum minerals in the range 100-200g/cu m and 1-2 g/cu m respectively. Sapphire has been observed in tin shed tailings and grades of 1-5g/ cu m of gem quality stone are possible.

The details of the operating costs, the mining methods and the environmental considerations are as described for Monarch deposit. The 4 sq km retention licence is also required for the same reasons of advanced economic assessment, studies of mining and processing techniques, environmental considerations including revegetated areas and marketing in a fluctuating price regime. It will be necessary to come to an accommodation with RNB Trading Pty Ltd which holds RL 1/1995 for construction materials covering part of the Pioneer deposit and there is also a council lease for the same purpose.

## 7.0 OUTLOOK

The LME price graph for refined tin metal shows that since VDM applied for mining leases in March 2005 there has been a decrease in the tin price from about US\$ 8,500/tonne to about US\$6,000/tonne.

The stockpiles at the LME remain at record lows with 6,500 tonnes (August, 2005) or only 2% of the estimated world production of 330,000 tonnes in 2004 (Mining Magazine, Nov. 2005).

However, projections are that the tin price will increase to US\$7,500/tonne in 2006 (Mining Journal, Nov 4, 2005) on the basis of increased demand for tin as a lead-free solder and in chemicals resulting in a market of 365,000 tonnes by 2008 (Mining Magazine, as above).

## 8.0 FORWARD PROGRAM

### PIONEER RESOURCE:

The company has expended considerable time and money to compile previous data into a modern GIS supported database. This material has then been used to calculate the various resources quoted by Terence Willstead &

Associates (Competent Person) in the company's Prospectus for admission to the AIM market of the London Stock exchange.

The Prospectus clearly states (See Page 79) that the company proposes that the Pioneer Resource forms part of the "Central Ringarooma Project" comprising this and the Endurance Resource. The company has made application for a Mineral Lease at Endurance preparatory to commencement of mining of that deposit. On page 79 the "Competent Person" reports that the company strategy for the Central Ringarooma project is to commence mining at the Endurance deposit and on completion of mining of that resource move the treatment plant to a new tenement yet to be applied for covering the Pioneer deposit.

The company feels it would not be justified in applying for a Mining Lease at Pioneer at this time given that the completion of mining at Endurance is 2 to 3 years away. Application is being sought for a Retention Licence over this area to allow the company to :

- Complete further GIS work preparatory to
- Completion of further ore resource and mining studies; and
- Completion of environmental studies.

As mining at Endurance nears completion the company would then make the relevant application for a mining lease or leases at Pioneer.

#### **MONARCH RESOURCE:**

In August 2001 Mineral Holdings Australia Pty limited reported that EL 10 / 2000 contained an "Indicated Mineral Resource (A, B and E Lens) of some 556,000 bank cubic metres (bcm) of alluvial wash containing 1.22 kg/bcm of 70% Sn concentrate plus rutile, zircon and sapphire. The company conducted some bulk sampling to confirm resource boundaries and grades.

In that report the company recognized that there were possible extensions to the resource to the south, south-east and east.

Following Van Dieman Mines acquisition of the tenement that company embarked on a re-assessment of the Licence and through the application of GIS methodology concluded that it was prudent to apply for ground adjoining EL 10/2000 to secure tenure of the prospective extensions. Recently the company has acquired further old exploration data and would propose over the next two years to conduct testing to establish resource extensions.

In the interim the company proposes to seek a Retention Licence over the area encompassed by EL 10/2000. Reasoning behind this application is:

- The company recognizes that the EL contains a “Resource” which given the high tin grades might be capable of being exploited using a small mobile treatment plant, time is required to conduct feasibility studies;
- This resource may be increased given exploration within the proposed RL and within the surrounding tenement EL 59/2004;
- The company is currently adding old data to its GIS database, that data may alter the size, shape and grade of the current Resource;
- The company would propose to conduct preliminary environmental assessments over the area of the Resource.

## 9.0 CONCLUSIONS

9.1 Exploration and evaluation by Van Dieman Mines Pty Ltd and Mineral Holdings Australia Pty Ltd of three previously mined alluvial tin deposits in the central Ringarooma Valley over the period 2000-2005 have recalculated and redefined the residual resources under the expiring ELs 10, 11 and 12/2000. The Endurance deposit covered by EL 11/2000 South Mt Cameron is now being developed within ML 14M/2004 which has just been granted. EL 10/2000 Monarch Flats and EL12/2000 Pioneer are the subject of these retention licence applications for flow on titles as a path for development.

9.2 The resources of alluvial tin wash in the deposits are-

**Monarch      556,751BCM at 1,220.00g/BCM of 70% Sn concentrate for  
679 tonnes of 70% Sn concentrates  
Indicated Mineral Resource**

**Pioneer      4,616,000BCM with an average grade of 872g/BCM  
containing 4,025 tonnes of SnO<sub>2</sub> concentrates  
Measured Mineral Resource**

9.3 Van Dieman Mines submits that Retention Licences are the appropriate flow-on title for these deposits at this stage on the path to eventual development. The company believes that having regard to its capitalization and debt financing that it should concentrate initially on the two MLs at Endurance and Scotia to bring them into production with a resultant cash flow. With a planned 2 years mine life at Endurance, the company can then move onto phasing Pioneer and Monarch into production. Until that time, the company seeks to hold these deposits as Retention Licences while still pursuing studies to bring them up to mining standard.

9.4 These alluvial resources are an integral part of Van Dieman Mines Ringarooma Tin Project which seeks to explore and develop the cassiterite, associated heavy minerals and sapphire placer deposits of the Ringarooma River Basin including the Great Northern Plains and offshore. The relatively well defined deposits at Monarch, Endurance, Pioneer and Scotia offer the best potential for the first production of tin concentrates from a potential resource of base 100,000 tonnes in a phased mining operation in NE Tasmania.

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