

# MINERAL HOLDINGS AUSTRALIA PTY LIMITED

## THE PIONEER PROJECT

E.L. 12 / 2000

## NORTH EAST TASMANIA

## REASSESSMENT

**PREPARED BY:**

*NIUGINI RESOURCES PTY., LIMITED.*

**DATE PREPARED:**

*20 November 2003*

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***Neil R. Kinnane – Geologist.***

*Fell.RMIT., Ass.RMIT (Geology).*

*FAusIMM, CPGeo., MGSAust., MGSAmer.*

*MAIG., AssGSCanada.*

## OVERVIEW

William Bradshaw discovered tin in the Pioneer area in 1877. The discovery was made near the junction of Bradshaw's Creek and the Ringarooma River. The first deposits worked were the shallow alluvials resulting from the reworking of the Pioneer and Wyniford Deep Lead by the Ringarooma River.

In the mid 1960's high world tin prices saw a resurgence of interest in the deposit. Utah took up extensive exploration Licence tenements in the area that partly covered the Pioneer resource. In 1967 Mr. Vern Woods acquired the Pioneer Leases from Utah and commenced mining along the south eastern side of the old workings. In 1970 B.M.I. purchased the Endurance operations and in doing so restricted the supply of water available to Woods from the old Frome Dam race. Woods continued operations until early 1976 when the Pioneer operations were purchased by Triako and Buka.

Amdex Mining on behalf of that consortium carried out extensive testing in a westerly direction from the old pit and established an ore reserve extending westward from the current worked area.

In 2002 Niugini Resources, on behalf of the tenement holder carried out a re-assessment of the deposit, as a result of that work the previously defined reserves were recalculated to be "Measured Mineral Resources", specifically:

a. RESOURCE AT 100 gm / m<sup>3</sup> CUT-OFF

5,513,000 m<sup>3</sup> at an average grade of 859.96 gm / m<sup>3</sup> SnO<sub>2</sub> at 70% Sn

This resource is overlain by 25,389,400 m<sup>3</sup> of overburden.

A stripping ratio of 4.6 : 1.

At this cut-off grade the deposit contains 4,741 tonnes of SnO<sub>2</sub> concentrate.

b. RESOURCE AT 200 gm / m<sup>3</sup> CUT-OFF

3,186,040 m<sup>3</sup> at an average grade of 1,164.82 gm / m<sup>3</sup> SnO<sub>2</sub> at 70% Sn

This resource is overlain by 19,829,200 m<sup>3</sup> of overburden.

A stripping ratio of 6.2 : 1.

At this cut-off grade the deposit contains 3,711 tonnes of SnO<sub>2</sub> concentrate.

In addition to these resources the tenement is considered to be highly prospective for the delineation of extensions to this resource base. Specifically the prospective areas are considered to be:

- a. The eastern extension around the edge of the old workings; and
- b. The western extension between the old workings and the postulated location of the ancestral Ringarooma River. This area is considered to have the potential to contain 3.5 million m<sup>3</sup> of tin bearing gravels at an average grade of 1,000 gm / m<sup>3</sup> or 3,500 tonnes of SnO<sub>2</sub> concentrate.

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## ELECTRONIC FILE FORMAT

EL122000_200309_01_report.pdf	Main Report and Appendices
EL122000_200309_02_map.tiff	Figure 4

## 1. INTRODUCTION

The Pioneer Project area is located in the south central section of the extensive Ringarooma River alluvial tinfield, a mineralised province that has historically produced in excess of 40,000 tonnes of tin from operations varying from small scale hand mining through to large scale dredging.

The Pioneer alluvial deposits are considered to be the outfall of the Wyniford Lead into the ancestral Ringarooma River floodplain. Tin is predominantly derived from the Wyniford Lead that sources its sediment load from the mineralised Blue Tier Batholith and in part from the upper sections of the ancestral Ringarooma River toward Branxholm and Derby. The resource is contained within a deep basin that extends northwards from the current Ringarooma River and then swings westward around the northern edge of Pioneer Township.

The principal cassiterite deposits are concentrated in a basal alluvial horizon resting immediately on granitic bedrock. The deposit consists of coarse, granite-derived sands with a high felspathic component, often difficult to distinguish from weathered basement, and erratically distributed gravel, pebble, cobble and boulder size horizons derived from granite and metamorphic sources, some ferruginous cement has been observed.

Basement palaeo-topography controls deposition and grade of the deposit. The basin like lead appears to have been deposited in a zone where change in elevation and thus a slowing of the ancestral Wyniford River resulted in the formation of a heavy mineral rich deposit. This is mirrored by current topography where the Wyniford River enters a steep gorge close to where it enters the current Ringarooma River

The bulk of the cassiterite is medium to fine grained, < 2.0 mm. Accessory mineral content is high, rutile, zircon, ilmenite and the REO's, monazite and possibly xenotime predominate.

Gold is reported as a regular component of the tin concentrates and old records seem to indicate that the SnO<sub>2</sub> : Au ratio is in the order of 600 to 650 : 1. Sapphire and corundum were regularly observed and abundant 2 to 3 mm sapphire was a problem component of the tin concentrates. Old records indicate that alluvial related to the Wyniford River section of the lead contained abundant gemmy sapphire, sizes varied from 2 mm to 10 mm, fine blue and yellow stones were recovered.

The abundance of these accessory minerals varies dependant on the position in the deposits in relation to both gradient and source. That is the sediment related to the Wyniford Lead report a higher sapphire component while the Ringarooma River sediments report less sapphire and higher gold.

Previous resource calculations have included both the cassiterite bearing basal wash and the barren overburden or “drift” of the old miners. By application of a 200 gm / m<sup>3</sup> cut-off grade and exclusion of the barren overburden it can be shown that the areal extent of the resource can be increased that in turn results in an increase of greater than 100% in contained tin concentrates. Further the resource remains open to the west, further drilling in that region would be expected to also increase the resource base.

## 2. LOCATION AND ACCESS

The project area is located in north-eastern Tasmania approximately 80 kilometres north-east of the northern City of Launceston. More specifically the project is located immediately north of the township of Pioneer on the northern bank of the Ringarooma River. See Figure 1.

Access to the area is excellent. An all-weather, sealed road provide vehicular access from Launceston through Scottsdale, Branxholm and Derby. Vehicular access is also available by a northern link via the towns of Bridport and Tomahawk. Bulldozed and graded sandy gravel bush tracks provide access throughout the Project area.

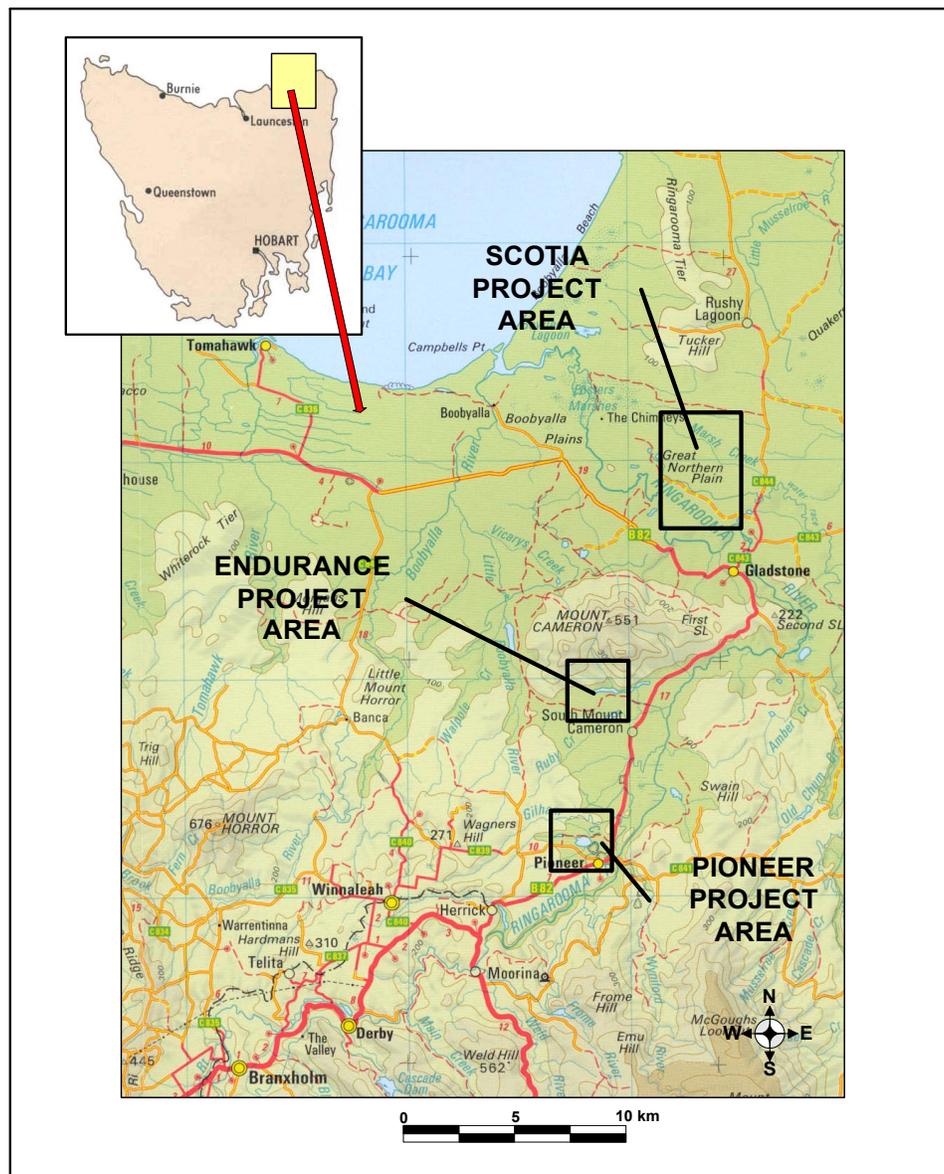


FIGURE 1 – LOCATION PLAN

### 3. TOPOGRAPHY AND CLIMATE

Topography throughout the area is somewhat undulating although the area of the main resource occupies a relatively broad basin like depression that runs northwards from the Ringarooma River and then turns westward around the northern edge of Pioneer Township. Elevations are in the order of 100 metres above sea level (ASL).

The drainage is dominantly east into the Ringarooma River although old workings have severely disrupted stream flows and many large lakes now occupy old mining cuts.

Climate is typically temperate maritime with four seasons and moderate temperatures. Locally winter is the coldest and wettest period. Daily winter temperatures (June to October) range from below 0°C to maximums in the 15 to 20°C range and in summer (November to February) from 15°C up to 30°C. Average annual rainfall varies from 890 mm to 1020 mm.

#### 4. TENURE

The project area is currently encompassed by a 4 sq. km Exploration Licence, EL 12 / 2000. Specifically:

Tenement Number	12 / 2000
Area	4 square km.
Location	Pioneer Township
Date of Grant	03 / 01 / 2000
Date of Expiry	08 / 12 / 2005
Beneficial Holder	Mineral Holdings Australia Pty., Limited. 11 Kent Court TOORAK, Vic 3142.
Contact	Mr. Neil Thomas. Managing Director
Contact Point	Phone: +61 3 9822 0077 Fax: +61 3 9824 7617 Email: tominex@iprimus.com.au

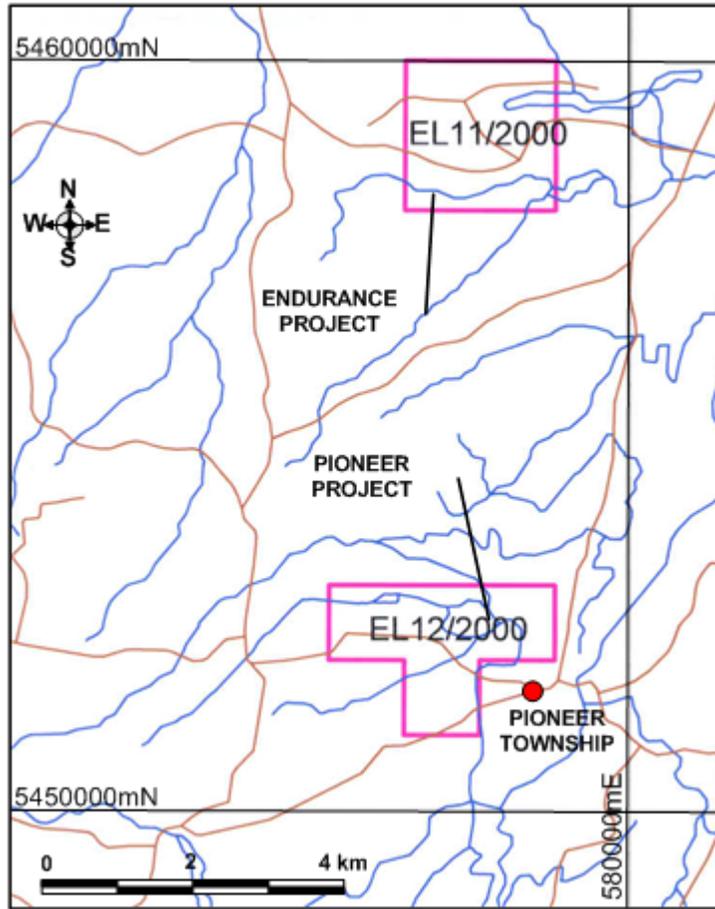


FIGURE 2 - TENEMENT LOCATION PLAN

## 5. HISTORICAL BACKGROUND

The following historical data has been reproduced from a report by Amdex Mining dated 24th March 1980

William Bradshaw discovered tin in the Pioneer district in 1877. The initial discovery by Bradshaw was at the junction of Bradshaw's Creek and the Ringarooma River in recent alluvium probably derived from the reworking of the Pioneer Lead by the Ringarooma River.

The Pioneer Tin Mining Company was formed in 1882 to work these shallow deposits however the operations were not successful and the workings were let on "Tribute" to Chinese miners who carried out successful operations until the late 1890's. Their activities and the working of the ground in a westerly direction led to the discovery of the rich "Pioneer Deep Lead". As a result of this discovery the Company took steps to restart the mine. They conducted drilling and constructed dams and water races prior to a restructuring of the Company in 1900.

Mining recommenced in 1900 and was carried out using hydraulic monitors with gravel being pumped to sluice boxes by steam driven pumps. Hydraulic elevators or conveyors were used to dispose of tailings. In 1909 the Company completed installation of a hydroelectric facility at the Frome Dam and during the same year the mining equipment was converted from steam to electricity.

Company operations were continued successfully until 1929 when the Ringarooma River, swollen by three days of continuous rain rose to record levels and despite pumping efforts flooded the workings. Sluicing recommenced in 1930 but declining grades and falling tin prices led to a cessation of operations in December 1931. At that time the workings were let to local "Tributors".

In October 1933 the Endurance Tin Mining Company purchased the Tasmanian assets of the Pioneer Company. Local operators continued to "Tribute" the workings until the mid 1940's. During that period the Endurance Company removed most of the plant and equipment for use at its Mt Cameron operations.

In 1935 the Austral Malay Tin Mining Company drilled 18 scout holes ahead of the old workings. Although no report is available pencilled comments on a plan at the Department of Mineral Resources suggests their assessment placed the reserves at 7.6 million m<sup>3</sup> of 297 gm SnO<sub>2</sub> / m<sup>3</sup>. Storey's Creek Tin Mining Company carried out further drilling during the period 1960 to 1961, drilling 15 holes in the vicinity of the old Pioneer pit.

By the time of these works the Endurance Company appears to have relinquished the Pioneer tenements favouring to retain the Frome Dam and water licenses to their Mt Cameron operations. Results of the Storey's creek drilling were disappointing, grades reported were lower than those reported in 1935 although this may be attributed to poor drilling and sampling procedures.

In the mid-1960's Utah Development Corporation acquired extensive exploration tenements in the area, these included the old Pioneer workings. In 1967 Mr. Vern Woods, a local resident, acquired the Pioneer Leases from Utah and commenced mining along the south-east edge of the old pit. Initially Woods used hydraulic monitor and gravel pumps to deliver wash to sluice boxes. Woods obtained his water supply from the Pioneer Race owned by the Endurance Company.

In 1970 B.M.I. acquired the Endurance operations and restricted the amount of water available to Woods. In 1973 Woods purchased the Frome Dam, power station and water races from B.M.I. and with larger volumes of water available was able to replace the sluice boxes with a modern jig plant.

Woods continued to mine until early 1976 when the Pioneer Operations were acquired by the Triako and Buka and operated as Kibuka Mines. Following that acquisition Amdex Mining, an associate of those groups continued to mine westward following the deep lead and in addition conducted an extensive drilling programme in the area.

The estimated production from the Pioneer lead up to that period is given as Table 1.

**TABLE 1**  
**PIONEER LEAD PRODUCTION**

<b>PERIOD</b>	<b>OPERATOR</b>	<b>VOLUME TREATED (m<sup>3</sup>)</b>	<b>STREAMED SnO<sub>2</sub> (Tonnes)</b>
1877 – 1900	Pioneer Tin Co. & Tributors	-	500 estimated
1900 – 1931	Pioneer Tin Co.	10,915,000	9,360
1931 – 1933	Pioneer Tin Co. & Tributors	Residues	142 estimated
1933 – 1946	Tributor for Endurance Co.	Residues	100 estimated
1967 – 1976	Vern Woods	1,000,000	242
1976 - 1979	Kibuka Mines	750,000	210
<b>TOTAL</b>			<b>10,554</b>

The Kibuka operations ceased in late 1979 following the collapse of the world tin price and introduction by the Australian Government and the International Tin Council of production quotas.

Little if any work has been undertaken in the Pioneer area since that time. In 2001 the area was acquired by Mineral Holdings Australia as an effort by the principal to aggregate the alluvial resources of the Middle and Lower Ringarooma basin into an economic resource base. Acquisition of drill data has enabled Mineral Holding to reassess the resource status at Pioneer in light of modern mining and alluvial treatment techniques.

## 6. GEOLOGICAL BACKGROUND

Traditionally the geological view of the alluvial tin deposits of the north east has been of a tin component being, in the main, derived from the tin bearing granites of the Blue Tier Batholith. Dramatic uplift, and a northwards shedding erosional profile, related to tropical or semi tropical environments during the Tertiary, resulted in rapid denudation of the Batholith and the formation of blanket and reworked tin bearing alluvials over a wide area of the north east.

It is unfortunate that geomorphological processes during this period are not well researched as clearly they control the economic deposition of alluvial tin. One of the foremost geologists, P.B. Nye (1932) has much to offer in general background in the north east and many of his personal notes and letters (Archived) and his published works provide an insight to the setting of Scotia and its satellite deposits. Information has also been obtained from work by Rattigan, 1958, Yim, 1991 and recent communication from D. Duncan. The following text is intended to provide a broad, but by no means complete, background to the formation of the cassiterite bearing alluvial and estuarine deposits.

The history of the region commenced in the Permo-Traissic with the unroofing, and commencement of erosion of, the cassiterite bearing granitic rocks of the Blue Tier and Scottsdale Batholiths.

The Late Jurassic saw a period of uplift accompanied by the intrusion of extensive dolerite sheets followed by widespread and intense erosion. Deep weathering during this period assisted in liberation of heavy minerals from the granitic hosts.

The Middle Eocene period saw the commencement of volcanic activity along the Blue Tier with the extrusion of the Older Basaltic flows. It is likely that these were emplaced along stream systems incised into the pre-Eocene granitic land surface.

Subsequent or contemporaneous uplift and a humid tropical climatic regimen resulted in rapid erosion of the basalts resulting in the introduction of a zircospilic suite of heavy minerals into the basal sediments of the deep lead deposits. Cassiterite rich pre-Eocene leads may still exist beneath the remnants of these flows.

Pre-Middle Eocene alluvial deposits were mixed and reworked with these younger basalt derived sediments giving rise to extensive flood plain alluvial deposits across the northern plains and southwards towards the present site of St Helens. No source vents for these rocks have as yet been located. The Mid Eocene to Late Oligocene appears to have been the dominant erosional and alluvial depositional period.

The Middle Miocene saw a second period of basaltic volcanism with extensive lava flows down many of the larger valleys in the region. These caused the diversion of the generally north west flowing streams of the Blue Tier; Black Creek, Cascade River, Main Creek, Weld River and the Wyniford River and the capture of those streams by the Ringarooma River. The capture of those streams created a broad shallow lake in the Mount Cameron Basin (south of the present mountain, the Dorset Flats). The Endurance deposit is considered to represent the northern expression of the ancestral Ringarooma River where it became entrenched immediately adjacent to the Mt Cameron massif and represented the westerly shedding outlet for the "Dorset Lake". Subsequently the lake overflowed into the sea via Garfield Creek and the Musselroe River reversing the river flow of the Ringarooma to the east.

During the post Oligocene a period of uplift and/or marine regression resulted in the lateritization and silicification of much of the land surface and probably saw the commencement of the deep incision of some streams into the Tertiary conglomeratic land surface (Scotia and Lochaber Leads). Subsequent rises in sea level saw the development of broad marine embayments at Boobyalla and in the lower Ringarooma River area and the development of cassiterite bearing blanket type deposits derived from proximal cassiterite bearing alluvial deposits, from some proximal cassiterite bearing hard-rock deposits and from larger streams such as the Scotia Lead.

Nye, 1932 reports that estuarine sediments can be recognized throughout the Scotia Project area and while the author believes this may be the case in the northern end of the area, the Scoloch Lead, the southern section takes the form of a deeply incised active, medium to high energy, terrestrial stream system.

In the Great Northern Plain deposits north of Scotia, marine concentration possibly by wave action in shallow waters or by current movement during periods of heavy terrestrial flood outflow and complicated by stream influx into an active estuarine environment are almost certainly the major controls on tin deposition.

Locally around this marine embayment marine processes appear to have resulted in the development of some cassiterite bearing strand line deposits.

The capture of the tributary of the Musselroe River in this Post Oligocene period saw the development of the modern Ringarooma River and the reworking of many of the alluvial cassiterite bearing deposits proximal to the stream. It is unclear if this period saw the river add to the sediment pile in the marine embayment or if the embayment was even active during this time.

## **THE RINGAROOMA DEPOSITS - ENDURANCE AND PIONEER**

Basement studies indicate that the Ringarooma River, the main regional river system ran eastwards and then northwards through the area occupied by the present Boobyalla River. The river was fed by a number of major tributaries, the Branxholm / Black Creek, Valley Creek, Cascade River, Main Creek, Weld River, OK Creek, Gladstone Creek and the Wyniford River.

During this period the tin bearing Blue Tier massif formed a major elevated mountainous area south of the Ringarooma River basin. Streams draining this massif were probably deeply dissected and high energy systems that contributed a major heavy mineral rich sediment load into the basin.

Sharp changes in gradient at the junction of these systems with the basin, resulted in a reduction in stream energy, and thus assisted the development of deeply entrenched, major tin bearing alluvial deposits. Basement topographic levels along the ancestral channel would seem to indicate that these basinal deposits were probably elevated above the levels of the main river channel.

Filling of these basins resulted in spilling of tin rich sediments further north to the main channel of the Ringarooma River.

About 16 Ma the Ringarooma River valley was partly flooded by the Younger Basaltic flows. These flows pushed the river to the south against the granite massif and in places, below Derby, the river was forced to incise its course into granitic basement rocks. In turn this isolated the paleo-Ringarooma River and its tin bearing basinal deposits under thick basaltic flows.

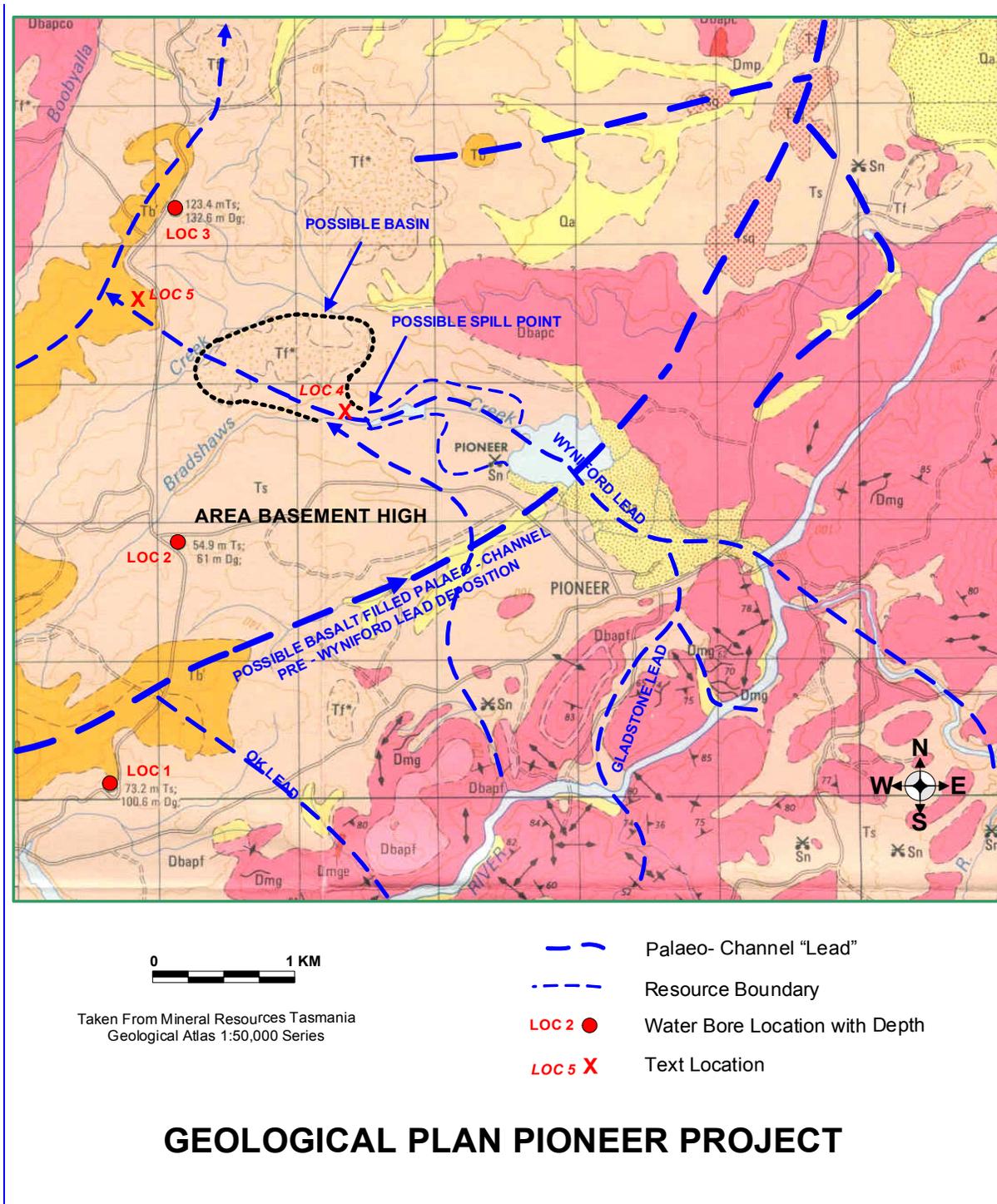


FIGURE 3 – GEOLOGICAL PLAN PIONEER DISTRICT

Deposits such as Arba, Valley, Briseis and Pioneer were worked where exposed along the edge of the basalt flows however many were not fully exploited because of thick basaltic cover.

The Pioneer deposit was first located by William Bradshaw in 1877 near the junction of Bradshaw's Creek and the Ringarooma River. The tin bearing deposits are considered to be of Tertiary age. They are probably Post Middle Eocene being pre-Younger Basalt.

The original Pioneer discovery was apparently made where the modern Ringarooma River cut the older Tertiary Wyniford Lead. From that point the Pioneer deposit trends north and then north-west toward the buried palaeo-channel of the Ringarooma River, Loc 5. The junction of these two systems is postulated to lie approximately 3 to 3.5 km north west of the Pioneer workings.

The palaeo – geography of the area is somewhat problematical. The ancestral channel of the Ringarooma is marked by a linear basalt flow immediately adjacent to and west of Loc 5. The possible basalt filled channel just north of and postulated to parallel the Pioneer – Derby road may represent an unrecognised pre-basalt palaeo-channel although there is no evidence as to which direction of flow this channel may have taken. A number of alternatives exist, specifically:

- ❖ The channel may commence on the area of basement high that separates the Wyniford Lead from the present day channel of the Ringarooma River;
- ❖ The OK Lead joins the channel and both flow westward from the basement high and then joining the ancestral Ringarooma near Herrick;
- ❖ The Wyniford Lead was entrenched along a granitic basement high probably in a similar fashion to the Endurance deposit probably as a result of headwater capture of the Wyniford and Gladstone Leads by a major south bank tributary of the ancestral Ringarooma; or
- ❖ If this channel in fact existed the Wyniford Lead may have cut and captured the stream prior to basalt outflow.

## 7. DATA ASSESSMENT

In preparing this Resource Statement as much of the previous exploration data as was available from both within the files of Mineral Holdings and on Open File at the Department of Minerals and Energy, Tasmania was accumulated and assessed.

### 7.1 PREVIOUS EXPLORATION DATA

Early exploration drill results of Austral Malay and Storey's Creek were available only on plan and as such were not suitable for use in this re-assessment. The most reliable data package appears to be the work by Amdex Mining. Detailed logs are now available as are various plans depicting drill hole and resource locations.

The most recent and definitive work is that by Amdex in 1980. Amdex used the influenced area – depth method to assess the reserves. The drilling pattern on which the Amdex reserves are based is not regular, grid orientation being changed part way through the program however broadly speaking Amdex used 50 metre by 100 metre grid spacings. Reserves were classified as “Proven”.

Grades used in the Amdex calculation are based on “Recovered Volumes” and tin results shown on the logs are treated as “Recovered Grades”. Previous drilling relied on the application of the “Radford factor” to determine volumes. In some of the early holes, (K19 to K29) the holes were not sampled. In those cases, Amdex used “Theoretical Volumes” in calculating grade. This application has probably resulted in several holes being undervalued because rarely is the theoretical volume recovered.

In addition many of the holes in the series K19 to K55 contain high concentrations of tin in basement samples. These are considered not to have penetrated basement to sufficient depth and have again caused an undervaluation of those holes. It should be noted however that Amdex continued the practice of calculating grades “Top to Bottom” or “Whole of Hole” of the drill holes probably because current mining practice at the time was to treat the resource “Top to Bottom”.

## 7.2 RECENT TESTING AND ASSESSMENT PROGRAMS

In June 2001 Mineral Holdings undertook a program of pitting, bulk sampling and sample treatment at the Monarch Project. Following the success of that program that included a re-assessment of the resource it was decided to briefly review the resource base at the Endurance and Pioneer Projects. This involved several on site inspections of the worked areas and included the collection of several alluvial heavy mineral concentrates to determine if valuable accessory minerals also occurred in conjunction with the cassiterite.

An inspection of the Pioneer data indicated that the Amdex resource was based on drill hole grades averaged "Top to Bottom" of all holes so that the resource included a substantial volume of barren overburden or "drift". Mineral Holdings in its work at the Monarch had already established that by removing this barren material from the resource calculation it was possible to increase the areal extent of the resource and also increase the volume of contained tin concentrate.

The Pioneer Project has undergone further re-assessment and a new resource base calculated. As a basis for this work each drill hole in the unmined sections of the Project was reviewed and all grades above 100 gm and 200 gm SnO<sub>2</sub> / m<sup>3</sup> cut-offs included in the new resource base.

## 7.3 RESULTS OF THE ASSESSMENT

Grade intersections at 100 and 200 gm SnO<sub>2</sub> / metre were extracted from the Amdex drill logs. This task proved difficult as there were a number of inconsistencies in the various generations of drilling, specifically.

- ❖ Some logs were in Imperial measurements and required conversion to metric measurement;
- ❖ Some logs measurements were in part Imperial and in part Metric;
- ❖ Results were given either as "Recovered", that is based on the volume recovered during drilling or as both "Recovered" and "Theoretical", in the latter case the Radford Factor had been applied.

There appears to have been no effort made by Amdex to standardise the logs. The tabulated grade results for both 100 gm/m<sup>3</sup> and 200 gm/m<sup>3</sup> appear as Appendix 10.1.

For the purposes of this report a simple volume calculation was made based on area by average depth. In this instance the Resource has been generated on geological data and thus is quoted as an “Indicated Mineral Resource”. Application of mining parameters and the use of the “Influenced Area – Depth” method would result in the production of a Proven and Probable Ore Reserve.

It was also noted during this assessment that many of the early holes, particularly those in the central section of the resource (Holes K19 to K29) were not sampled in the central sections of the hole. In these cases Amdex calculate grade using “Theoretical Volume” and thus grade may be undervalued for those holes.

It was also noted that many holes, again, in the early drilling terminated in high-grade wash and not basement. This may also have resulted in the Amdex resource being undervalued. These observations also apply to the current assessment that relies heavily on the previous Amdex work.

This resource lies west of the old Pioneer Workings and does not include the area to the east, that is, the area previously drilled by the Pioneer Mining Company, Austral Malay and Storeys Creek Tin. Amdex did not include in their resource calculations areas to the south-east of the old workings, that is around the Football Ground and south of the Cyclone tails heap.

## 8. RESOURCE

Two resources are quoted here, specifically that prepared by Amdex Mining in 1980 and a current recalculation based on their drilling and reporting of drill results.

### 8.1 AMDEX RESOURCE

Grades used by Amdex were based on grades reported in holes drilled by Amdex Mining during the period 1980 to 1984. Amdex noted that in order to conduct the evaluation the “whole of hole” grades were calculated using only the grades from the sampled section. Unsampled intervals were assigned theoretical volumes with a zero grade. Cut-off grades of 200 gm/m<sup>3</sup> and 100 gm/m<sup>3</sup> were used and only that section of the resource considered to be “Proven” was quoted. Amdex calculated reserve volumes using the “Influence Area – Depth” method.

**TABLE 1**  
**AMDEX RESOURCE - 1984**

CLASS	CUT-OFF GRADE (gm SnO <sub>2</sub> / m <sup>3</sup> )	VOLUME M <sup>3</sup>	WT. AV. GRADE (gm SnO <sub>2</sub> / m <sup>3</sup> )	CONTAINED SnO <sub>2</sub> Tonnes
Proven	200	3,833,115	333.6	1,275
Proven	100	5,448,353	279.6	1,523

### 8.2 CURRENT RE-ASSESSMENT

In this calculation no effort was made to differentiate between “Proven, Probable and Possible Reserves” and “Resources” and the resource is considered to fall into the “**Measured Mineral Resource**” status. Table 2 quantifies the resource.

**TABLE 2**  
**PIONEER PROJECT - RESOURCE DATA**  
**POSSIBLE ORE RESOURCE**

CUT-OFF GRADE GM/ M <sup>3</sup>	N0. HOLE S	DEPTH O/B M	DEPTH WASH M	GRADE GM/M <sup>3</sup> SnO <sub>2</sub>	AREA M <sup>2</sup>	VOLUME O/B M <sup>3</sup>	VOLUME WASH M <sup>3</sup>	CONTAINED SnO <sub>2</sub> Tonnes
100	114	34.31	7.45	859.96	740,000	25,389,400	5,513,000	4,740
200	111	35.60	5.72	1,164.82	557,000	19,829,200	3,186.040	3,711

For detail of drill hole locations the reader is referred to the Report by Amdex, listed in Section 9.0, Bibliography. An approximate outline of the +100 gm/m<sup>3</sup> cut-off resource is provided as Figure 3.

### 8.3 RESOURCE EXTENSION

An assessment of previous data indicates possible extensions to the resource base by:

- Recalculation of all drill hole data with the removal of overburden sections that, it is felt, will extend the resource boundaries into what now appears to be marginal ground;
- Extension of the resource to the west, south-west and south of the area presently drilled;
- Define by drilling the northern boundary of the resource;
- Locate old drill data relating to the area east of the old Pioneer workings (Austral Malay, Pioneer Tin Mining Company and Storey's Creek Tin) where there appears to be a shallow higher grade resource present

These extensions are considered to have the prospectivity to contain 3.5 million m<sup>3</sup> at an average grade of 1,000 gm / m<sup>3</sup> of SnO<sub>2</sub> at 70% Sn or 3,500 tonnes of SnO<sub>2</sub>.

## 9. CONCLUSIONS

Following a reassessment of the previous data it would appear that a recalculation of the resource base in respect of:

- ❖ The effect of removing barren overburden from the calculation of grade of each drill hole;
- ❖ Application of the removal of overburden from grade calculations in holes marginal to the resource; and
- ❖ Inclusion of drilling previously not included in resource calculations

has effectively increased the resource of contained SnO<sub>2</sub> concentrate by +100% from 1,500 tonnes to some 3,700 tonnes.

Further exploration including shallow seismic or GPR surveys followed by drilling in areas to the west and south-west may also further expand the resource base. Effort should also be directed to locating old drill results for the area of the deposit lying east of the old Pioneer workings. Data currently available indicates the area may contain shallow high-grade resources that would make an ideal preliminary mining target.

In reviewing the resource no effort has been made at this time to quantify the content of accessory minerals present in the basal wash zone. These minerals include, rutile, zircon, ilmenite, gold, sapphire, the REO's monazite and xenotime and possibly a tantalite/columbite mineral. While these minerals have been quantified in other resources in the region, resources that have the same mineralogical derivation as the alluvials at the Pioneer, their contents at the Pioneer Mine remain conjectural. Ample evidence exists to suggest that rutile, zircon and ilmenite occur in grades of 50 to 200 gm/m<sup>3</sup>, gold at 10 mgm/m<sup>3</sup>, REO's in the order of 100 to 200 gm/m<sup>3</sup> and Ta minerals in the order of 1 to 2 gm/m<sup>3</sup>. Sapphire has been observed in tin shed tailings and grades of 1 to 5 gm/m<sup>3</sup> of gem quality stone are predicted.

Clearly some work remains to be done on the Pioneer Project to up-grade and increase the resource. This work should include quantitative testing for accessory minerals.

## 10. RECOMMENDATIONS

It is recommended that Mineral Holdings carry out the following activities, specifically:

- a. Immediately make application to secure the resource under Retention License tenure while economic assessments and pre-mining feasibilities are conducted;
- b. Convert all old data into digital format, such work to include drill logs and mapping;
- c. Immediately commence an economic assessment of the resource, such assessment to include accessory mineral components; gold, sapphire, tantalite, rutile and zircon;
- d. Commence a pre-mining feasibility study to include mining technique, processing technique and environmental considerations.

**11. BIBLIOGRAPHY**

NEALE, T. I. 1980

Ore Reserves of Alluvial Tin Deposits in Northeastern Tasmania.

Amdex Mining Limited.

**12. APPENDIX**

**12.1 DRILL LOG RECALCULATION SHEETS**

## ALLUVIAL DRILL HOLE RESULT SUMMARY - 100 gm CUT-OFF

PROJECT: Pioneer

TENEMENT: E.L 12/2000

DATE: 18/12/02

RECALCULATION

WESTERN RESOURCE

SHEET 1

HOLE NUMBER	COLLAR R.L m	B/MENT R.L m	DEPTH BASEMENT	DEPTHS			
				O/B m	WASH m	GRADE g/m <sup>3</sup>	WEIGHTED W X G
K19	81.00	49.61	31.39	24.38	7.62	496.80	3785.62
K20	83.25	49.11	34.14	28.96	7.62	713.00	5433.06
K21	84.72	44.78	39.93	28.95	10.67	616.71	6580.30
K23	86.98	43.09	43.89	28.96	16.76	930.73	15599.03
K24	87.35	46.20	41.15	32.00	9.14	272.00	2486.08
K25	86.38	47.66	38.71	32.00	7.62	415.40	3165.35
K28	77.85	52.10	25.76	19.81	6.10	570.00	3477.00
K31	85.20	49.50	35.66	27.43	8.23	161.85	1332.03
K32	81.78	49.17	32.61	27.43	6.10	268.75	1639.38
K33	83.25	49.10	34.14	27.43	6.71	143.14	960.47
K34	85.90	46.25	39.62	30.48	9.14	850.33	7772.02
K36	89.75	45.24	44.50	41.15	4.57	185.33	846.96
K37	89.72	45.21	44.50	38.10	6.10	234.75	1431.98
K38	85.54	44.23	41.30	33.53	1.52	103.00	156.56
K39	88.81	44.00	44.81	35.05	10.67	457.57	4882.27
K40	90.12	46.93	43.28	38.10	5.18	302.53	1567.11
K41	83.30	51.30	32.00	30.00	3.00	287.33	861.99
K42	73.48	49.73	23.75	12.00	13.00	1324.38	17216.94
K43	80.83	47.40	33.50	28.00	6.00	1038.67	6232.02
K44	74.39	47.90	26.50	18.00	9.00	304.30	2738.70
K45	73.20	45.70	27.50	18.00	10.00	340.00	3400.00
K48	84.05	51.55	32.50	28.00	4.00	236.50	946.00
K50	88.24	49.00	39.25	36.00	4.00	223.00	892.00
K51	82.83	47.83	35.00	22.00	13.00	450.92	5861.96
K52	75.48	51.00	24.50	16.00	9.50	376.68	3578.46
K53	85.72	49.47	36.25	30.00	7.00	4184.14	29288.98
K54	86.70	50.20	36.50	32.00	6.00	865.00	5190.00
K55	84.70	48.50	36.20	30.00	7.00	1196.43	8375.01
K57	88.18	46.43	41.75	32.00	10.00	556.60	5566.00
K58	86.04	44.04	42.00	30.00	13.00	2649.23	34439.99
K59	87.68	44.30	43.38	34.00	8.00	993.25	7946.00
K60	84.72	47.92	36.80	30.00	8.00	715.00	5720.00
K61	84.97	47.77	37.20	30.00	6.00	215.67	1294.02
K62	84.84	44.34	40.50	32.00	11.50	1895.57	21799.06
K63	86.16	44.66	41.50	32.00	11.00	365.45	4019.95
K64	86.52	46.02	40.50	24.00	21.00	651.14	13673.94
K65	85.64	47.45	38.20	34.00	4.00	209.00	836.00
K66	83.57	46.67	36.90	24.00	14.00	218.86	3064.04
K68	87.70	44.70	43.00	26.00	18.00	161.78	2912.04
K69	90.00	48.80	41.20	38.00	4.00	104.00	416.00
K70	84.57	44.67	39.90	34.00	2.00	101.00	202.00
K72	85.3	46.3	39.00	32.00	9.00	1393.67	12,543.03
K73	84.82	46.82	38.00	32.00	6.00	230.33	1,381.98
K74	83.87	44.37	39.50	30.00	2.00	154.00	308.00
K75	93.14	49.64	43.50	42.00	4.00	369.00	1,476.00
K76	88.53	44.03	44.50	34.00	12.00	1402.25	16,827.00
K77	93.67	48.62	45.00	42.00	4.00	444.00	1,776.00
K78	91.87	47.17	44.70	40.00	6.00	499.67	2,998.02
K80	90.45	44.95	45.50	40.00	9.00	947.89	8,531.01

## ALLUVIAL DRILL HOLE RESULT SUMMARY - 100 gm CUT-OFF

PROJECT: Pioneer

TENEMENT: E.L 12/2000

DATE: 18/12/02

RECALCULATION

WESTERN RESOURCE

SHEET 2

HOLE NUMBER	COLLAR R.L m	B/MENT R.L m	DEPTH BASEMENT	DEPTHS			
				O/B m	WASH m	GRADE g/m <sup>3</sup>	WEIGHTED W X G
K81	91.06	46.36	44.70	40.00	8.00	2,385.25	19,082.00
K82	89.94	44.44	45.50	42.00	7.00	1,598.57	11,189.99
K83	88.66	48.26	40.40	38.00	4.00	1,137.50	4,550.00
K84	91.38	45.88	45.50	40.00	9.00	850.44	7,653.96
K86	90.99	48.99	42.00	38.00	8.00	704.50	5,636.00
K88	92.69	52.49	40.20	38.00	4.00	197.00	788.00
K89	89.89	44.89	45.00	40.00	4.00	223.50	894.00
K90	89.36	49.36	40.00	36.00	6.00	245.33	1,471.98
K92	89.30	47.50	41.70	38.00	4.00	597.00	2,388.00
K94	89.60	48.40	41.20	38.00	6.00	386.00	2,316.00
K95	81.35	47.65	33.70	28.00	6.00	325.00	1,950.00
K98	91.43	50.43	41.00	38.00	6.00	181.67	1,090.02
K99	83.41	47.61	35.80	24.00	12.00	386.67	4,640.04
K101	99.40	49.00	50.46	46.00	8.00	624.25	4,994.00
K102	101.18	47.38	53.80	46.00	10.00	212.20	2,122.00
K103	95.38	47.38	48.00	42.00	8.00	708.25	5,666.00
K104	90.89	46.59	44.30	42.00	4.00	171.50	686.00
K108	98.19	50.49	47.70	46.00	4.00	216.50	866.00
K109	99.24	51.54	47.70	44.00	7.00	809.71	5,667.97
K110	92.49	51.49	41.00	34.00	12.00	698.00	8,376.00
K111	98.19	48.69	49.50	44.00	10.00	1,734.30	17,343.00
K112	100.84	50.64	50.10	48.00	7.00	899.43	6,296.01
K113	97.12	48.12	49.00	42.00	9.00	302.89	2,726.01
K114	97.46	50.56	46.90	40.00	10.00	573.00	5,730.00
K115	94.80	50.30	44.50	38.00	10.00	882.10	8,821.00
K116	99.23	53.33	45.80	42.00	6.00	448.33	2,689.98
K117	91.80	55.39	36.50	34.00	8.00	247.88	1,983.04
K118	94.59	51.59	43.00	40.00	4.00	126.50	506.00
K119	95.83	49.83	46.00	42.00	7.00	1,781.29	12,469.03
K120	93.80	46.90	46.90	36.00	12.00	171.33	2,055.96
K121	95.38	49.38	46.00	42.00	6.00	342.00	2,052.00
K122	85.28	50.28	35.00	30.00	7.00	1,165.29	8,157.03
K123	82.10	50.10	29.32	26.00	10.00	936.90	9,369.00
K124	85.43	51.63	33.80	26.00	10.00	778.41	7,784.10
K125	94.30	51.50	42.80	38.00	7.00	453.39	3,173.73
K126	90.98	51.48	39.50	36.00	7.00	813.93	5,697.51
K127	84.53	53.23	31.30	30.00	4.00	384.93	1,539.72
K129	91.25	53.45	37.80	34.00	5.00	381.56	1,907.80
K132	83.30	55.30	28.00	20.00	4.00	122.70	490.80
K133	88.03	53.63	34.40	32.00	4.00	190.40	761.60
K134	93.74	45.25	48.50	40.00	10.00	1,281.20	12,812.00
K139	92.01	49.51	42.50	38.00	4.00	181.67	726.68
K140	92.11	49.11	43.00	38.00	9.00	508.79	4,579.11
K141	90.85	49.35	41.50	36.00	6.00	364.00	2,184.00
K142	97.89	51.89	46.00	40.00	15.00	1,093.14	16,397.10
K143	92.41	49.91	42.50	38.00	5.00	952.62	4,763.10
K144	95.64	48.44	47.20	46.00	3.00	288.70	866.10
K145	92.67	49.67	43.00	38.00	10.00	2,408.87	24,088.70



## ALLUVIAL DRILL HOLE RESULT SUMMARY - 200 gm CUT-OFF

PROJECT: Pioneer

TENEMENT: E.L 12/2000

DATE: 18/12/02

RECALCULATION

WESTERN RESOURCE

SHEET 4

HOLE NUMBER	COLLAR R.L m	B/MENT R.L m	DEPTH BASEMENT	DEPTHS			
				O/B m	WASH m	GRADE g/m <sup>3</sup>	WEIGHTED W X G
K19	81.00	49.61	31.39	25.90	6.10	592.25	3612.73
K20	83.25	49.11	34.14	30.48	4.57	1,110.00	5072.70
K21	84.72	44.78	39.93	28.95	10.67	616.71	6580.30
K23	86.98	43.09	43.89	28.96	16.76	930.73	15599.03
K24	87.35	46.20	41.15	32.00	4.57	380.00	1736.60
K25	86.38	47.66	38.71	33.53	6.10	475.25	2899.03
K28	77.85	52.10	25.76	19.81	6.10	570.00	3477.00
K32	81.78	49.17	32.61	27.43	4.57	315.67	1442.61
K33	83.25	49.10	34.14	32.00	1.52	244.00	370.88
K34	85.90	46.25	39.62	30.48	9.14	850.33	7772.02
K36	89.75	45.24	44.50	42.67	1.52	280.00	425.60
K37	89.72	45.21	44.50	39.62	3.05	319.50	974.48
K38	85.54	44.23	41.30	33.53	1.52	103.00	156.56
K39	88.81	44.00	44.81	35.05	10.67	457.57	4882.27
K40	90.12	46.93	43.28	41.14	2.13	611.14	1301.73
K41	83.30	51.30	32.00	30.00	3.00	287.33	861.99
K42	73.48	49.73	23.75	12.00	13.00	1,324.38	17216.94
K43	80.83	47.40	33.50	28.00	6.00	1,038.67	6232.02
K44	74.39	47.90	26.50	20.00	4.00	531.00	2124.00
K45	73.20	45.70	27.50	20.00	8.00	394.00	3152.00
K48	84.05	51.55	32.50	30.00	2.00	366.00	732.00
K50	88.24	49.00	39.25	38.00	2.00	320.00	640.00
K51	82.83	47.83	35.00	26.00	9.00	581.33	5231.97
K52	75.48	51.00	24.50	20.00	5.50	569.54	3132.47
K53	85.72	49.47	36.25	30.00	7.00	4,184.14	29288.98
K54	86.70	50.20	36.50	32.00	6.00	865.00	5190.00
K55	84.70	48.50	36.20	30.00	7.00	1,196.43	8375.01
K57	88.18	46.43	41.75	34.00	8.00	667.50	5340.00
K58	86.04	44.04	42.00	32.00	11.00	3,111.45	34225.95
K59	87.68	44.30	43.38	34.00	8.00	993.25	7946.00
K60	84.72	47.92	36.80	30.00	8.00	715.00	5720.00
K61	84.97	47.77	37.20	32.00	2.00	286.00	572.00
K62	84.84	44.34	40.50	32.00	11.50	1,895.57	21799.06
K63	86.16	44.66	41.50	38.00	4.00	806.50	3226.00
K64	86.52	46.02	40.50	32.00	12.00	1,072.17	12866.04
K65	85.64	47.45	38.20	34.00	2.00	248.00	496.00
K66	83.57	46.67	36.90	34.00	4.00	381.00	1524.00
K68	87.70	44.70	43.00	40.00	4.00	376.50	1506.00
K72	85.3	46.3	39.00	32.00	8.00	1,546.00	12,368.00
K73	84.82	46.82	38.00	36.00	2.00	446.00	892.00
K75	93.14	49.64	43.50	42.00	4.00	369.00	1,476.00
K76	88.53	44.03	44.50	34.00	12.00	1,402.25	16,827.00
K77	93.67	48.62	45.00	42.00	4.00	444.00	1,776.00
K78	91.87	47.17	44.70	40.00	6.00	499.67	2,998.02
K80	90.45	44.95	45.50	42.00	6.00	1,345.33	8,071.98
K81	91.06	46.36	44.70	40.00	8.00	2,385.25	19,082.00
K82	89.94	44.44	45.50	42.00	6.00	1,846.33	11,077.98
K83	88.66	48.26	40.40	38.00	4.00	1,137.50	4,550.00
K84	91.38	45.88	45.50	40.00	8.00	941.75	7,534.00

## ALLUVIAL DRILL HOLE RESULT SUMMARY - 200 gm CUT-OFF

PROJECT: Pioneer

TENEMENT: E.L 12/2000

DATE: 18/12/02

RECALCULATION

WESTERN RESOURCE

SHEET 5

HOLE NUMBER	COLLAR R.L m	B/MENT R.L m	DEPTH BASEMENT	DEPTHS			
				O/B m	WASH m	GRADE g/m <sup>3</sup>	WEIGHTED W X G
K86	90.99	48.99	42.00	40.00	6.00	896.67	5,380.02
K88	92.69	52.49	40.20	40.00	2.00	240.00	480.00
K89	89.89	44.89	45.00	40.00	4.00	223.50	894.00
K90	89.36	49.36	40.00	38.00	2.00	479.00	958.00
K92	89.30	47.50	41.70	38.00	4.00	597.00	2,388.00
K94	89.60	48.40	41.20	40.00	4.00	514.00	2,056.00
K95	81.35	47.65	33.70	30.00	4.00	393.00	1,572.00
K98	91.43	50.43	41.00	40.00	2.00	317.00	634.00
K99	83.41	47.61	35.80	32.00	4.00	1,006.00	4,024.00
K101	99.40	49.00	50.46	46.00	6.00	794.33	4,765.98
K102	101.18	47.38	53.80	50.00	2.00	403.00	806.00
K103	95.38	47.38	48.00	42.00	8.00	708.25	5,666.00
K108	98.19	50.49	47.70	46.00	2.00	321.00	642.00
K109	99.24	51.54	47.70	44.00	6.00	921.67	5,530.02
K110	92.49	51.49	41.00	36.00	6.00	1,250.67	7,504.02
K111	98.19	48.69	49.50	44.00	8.00	2,123.25	16,986.00
K112	100.84	50.64	50.10	48.00	6.00	1,030.83	6,184.98
K113	97.12	48.12	49.00	44.00	6.00	391.00	2,346.00
K114	97.46	50.56	46.90	42.00	8.00	675.50	5,404.00
K115	94.80	50.30	44.50	40.00	7.00	1,163.00	8,141.00
K116	99.23	53.33	45.80	44.00	3.00	719.33	2,157.99
K117	91.80	55.39	36.50	34.00	4.00	385.50	1,542.00
K119	95.83	49.83	46.00	44.00	4.00	3,037.25	12,149.00
K121	95.38	49.38	46.00	44.00	3.00	511.97	1,535.91
K122	85.28	50.28	35.00	33.00	3.00	2,538.33	7,614.99
K123	82.10	50.10	29.32	26.00	9.00	1,028.38	9,255.42
K124	85.43	51.63	33.80	26.00	9.00	850.48	7,654.32
K125	94.30	51.50	42.80	40.00	4.00	707.75	2,831.00
K126	90.98	51.48	39.50	36.00	5.00	1,091.98	5,459.90
K127	84.53	53.23	31.30	30.00	3.00	459.83	1,379.49
K129	91.25	53.45	37.80	34.00	4.00	431.85	1,727.40
K134	93.74	45.25	48.50	42.00	8.00	1,556.75	12,454.00
K140	92.11	49.11	43.00	40.00	6.00	687.17	4,123.02
K141	90.85	49.35	41.50	38.00	4.00	460.00	1,840.00
K142	97.89	51.89	46.00	40.00	15.00	1,093.14	16,397.10
K143	92.41	49.91	42.50	38.00	5.00	952.62	4,763.10
K144	95.64	48.44	47.20	46.00	2.00	372.90	745.80
K145	92.67	49.67	43.00	38.00	10.00	2,408.87	24,088.70
K150	98.19	47.19	51.00	42.00	10.00	1,529.38	15,293.80
K150R	98.19	47.19	51.00	46.00	4.00	3,812.00	15,248.00
K151	92.49	50.49	41.00	38.00	4.00	9,044.00	36,176.00
K153	91.06	46.06	45.00	40.00	8.00	2,923.25	23,386.00
K165	96.98	52.58	44.00	40.00	8.00	1,446.40	11,571.20
K202	89.60	45.60	44.00	39.00	4.00	1,522.78	6,091.12
K206	95.2	39.70	55.50	49.00	1.00	401.30	401.30
K237	47.70	39.20	39.20	38.00	2.00	228.80	457.60
K238	87.10	47.70	39.30	38.00	4.00	1,182.90	4,731.60
K239	86.00	52.00	34.00	30.00	6.00	699.52	4,197.12

