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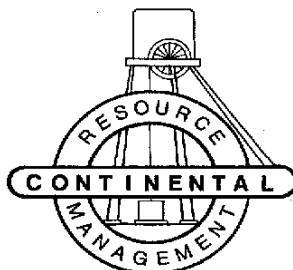
15. APPENDICES



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15.1. Reserves Report

Continental Resource Management Pty Ltd Report, WA03/019, dated 1 September 2003.



HARTS RANGE GARNET-AMH PROJECT

RESERVE REPORT, AUGUST, 2003

OLYMPIA RESOURCES LIMITED

REPORT NUMBER WA03/019

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| DISTRIBUTION: | Olympia Resources N.L. | 3 |
| | Continental Resource Management Pty Ltd | 1 |

DATE: Monday, 1 September 2003

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| Appendix 2 Sample Location File | On enclosed CD-ROM |
| Appendix 3 Drill Hole Collar File | On enclosed CD-ROM |
| Appendix 4 Grain Size and Heavy Mineral Distribution Data | On enclosed CD-ROM |
| Appendix 5 Garnet Content Determinations by MI | On enclosed CD-ROM |
| Appendix 6 <i>In Situ</i> Bulk Density Determinations | On enclosed CD-ROM |
| Appendix 7 Reserve Data | On enclosed CD-ROM |

EXECUTIVE SUMMARY

During 2002 Olympia Resources Limited (Olympia) undertook an extensive air-core exploration programme in the Harts Range district. Large resources of hornblende and garnet rich sand were identified in deposits either side of the Plenty Highway. Metallurgical testwork carried out by HBH Consultants (HBH) and Lakefield Oretest established recovery criteria for garnet and hornblende.

Olympia have applied for a mining lease (MLA23868) over a part of their Mount Riddoch Dunes exploration licence (EL10150). They propose to construct their Aturga Mine within this lease and to produce both garnet and aluminio-magnesio-hornblende (AMH) concentrates. Some of the resources previously defined within the lease area have been converted into reserves. This report documents the estimation of these reserves.

The total estimated reserves of garnet (2.3Mt) and AMH (6.1Mt) are sufficient to support production of 100,000t of garnet and 300,000t of AMH per year for 20 years. This is much greater than the anticipated yearly production.

A summary of these reserves is in Table 1

Table 1 Reserve Summary - Harts Range Garnet - AMH Project

| ORE TYPE | ORE | GARNET in Sand | GARNET Recovered | AMH in Sand | AMH Recovered |
|--------------------------------|-------------------|---------------------------|-----------------------------|------------------------|--------------------------|
| | (t) | (t) | (t) | (t) | (t) |
| PROVEN | | | | | |
| DUNE | 25,000,000 | 1,600,000 | 720,000 | 6,900,000 | 2,100,000 |
| FLOODPLAIN | 3,400,000 | 220,000 | 120,000 | 960,000 | 340,000 |
| PALEOCHANNEL | 6,000,000 | 390,000 | 230,000 | 1,400,000 | 570,000 |
| SWALE | 1,600,000 | 98,000 | 52,000 | 370,000 | 120,000 |
| TOTAL PROVEN | 36,000,000 | 2,300,000 | 1,100,000 | 9,600,000 | 3,100,000 |
| PROBABLE | | | | | |
| CREEK CHANNEL | 440,000 | 49,000 | 30,000 | 110,000 | 43,000 |
| FLOODPLAIN AND PALEOCHANNEL | 16,000,000 | 1,200,000 | 680,000 | 4,200,000 | 1,600,000 |
| DUNE | 18,000,000 | 1,000,000 | 480,000 | 4,800,000 | 1,400,000 |
| TOTAL PROBABLE | 35,000,000 | 2,300,000 | 1,200,000 | 9,100,000 | 3,100,000 |

INTRODUCTION

During 2002 Olympia Resources Ltd (Olympia) undertook an extensive air-core exploration programme in the Harts Range district. Large resources of amphibole and garnet rich sand were identified in deposits either side of the Plenty Highway. Metallurgical testwork has been carried out by HBH Consultants (HBH) and Lakefield Oretest. They have established recovery criteria for both garnet and amphibole.

Olympia have applied for a mining lease (MLA23868) over a part of their Mount Riddoch Dunes exploration licence (EL10150). They propose to construct their Aturga Mine within this lease and to produce both garnet and alumino-magnesio-hornblende (AMH) concentrates. A portion of the resources previously defined within the lease area have been converted into reserves. This report documents the estimation of these reserves.

Continental Resource Management Pty Ltd (CRM) supervised, on behalf of Olympia, an air-core drilling programme on EL10150 in the Harts Range, Northern Territory, during late 2002 (Doepel, 2003). The drilling was successful in delineating substantial resources of garnet and AMH in four geological environments. The environments are:

- Stable desert dunes
- Floodplains of modern creeks and rivers
- Palaeochannels, possibly Tertiary in age
- Modern river channels

The dunes form the Riddoch Dune Field (the Riddoch Dunes). They contain a large amount of heavy mineral, with grades averaging 44% in their sand fraction, which constitutes 80% of the dunes. The heavy mineral fraction averages 18% garnet and 76% AMH. The garnet is similar in grain size distribution to that produced by GMA Garnet at Port Gregory in Western Australia, but is significantly more angular.

Substantial floodplains are present beside Aturga Creek within EL10150 and the Plenty River within EL9190. They are also heavy mineral rich, the Aturga Creek floodplain averaging 45% in the sand fraction, which constitutes 76% of the material. The heavy minerals average 17% garnet and 76% AMH. The grain size distribution of the garnet and AMH in the floodplain material is coarser than in the dunes.

Paleochannels are present both beneath the floodplains and the adjoining dunes. These are also rich in heavy minerals (45% in the sand fraction, which is 74% of the total). They contain both a higher proportion of garnet (20% garnet and 74% AMH) and coarser garnet and AMH than do the overlying units.

Resources of garnet and AMH are also present in the sand wash of the Aturga Creek channel. Sand comprises 79% of the wash and has a heavy mineral content of 47%. The garnet is coarser grained than that in the other units and constitutes 30% of the heavy mineral fraction. The AMH is also coarser and it constitutes 65% of heavy mineral fraction.

CRM estimated garnet resources within a number of Olympia's Harts Range Garnet Project licence areas, the majority of which were within EL10150 (Baxter and Doepel, 2003). This report converts some of the resources estimated within EL10150 into reserve estimates. It

also recognizes that the contained AMH can be extracted and sold economically and it incorporates AMH in the reserves.

It is identified that John Baxter, who has had in excess of 5 years experience in assessing heavy mineral sand deposits, is the Competent Person with respect to this reserve report.

LOCATION AND ACCESS

The Harts Range Garnet-AMH Project is located 120km northeast of Alice Springs in the Northern Territory. By road it is 100km east of the Darwin to Alice Springs railway line. Access from Alice Springs is north along the sealed Stuart Highway for 70km and then east along the Plenty Highway for 108km, the first 80km of which is sealed. (Figure 1).

All coordinates referred to in this report are WGS84 coordinates, which are, for practical purposes, the same as MGA94 coordinates.

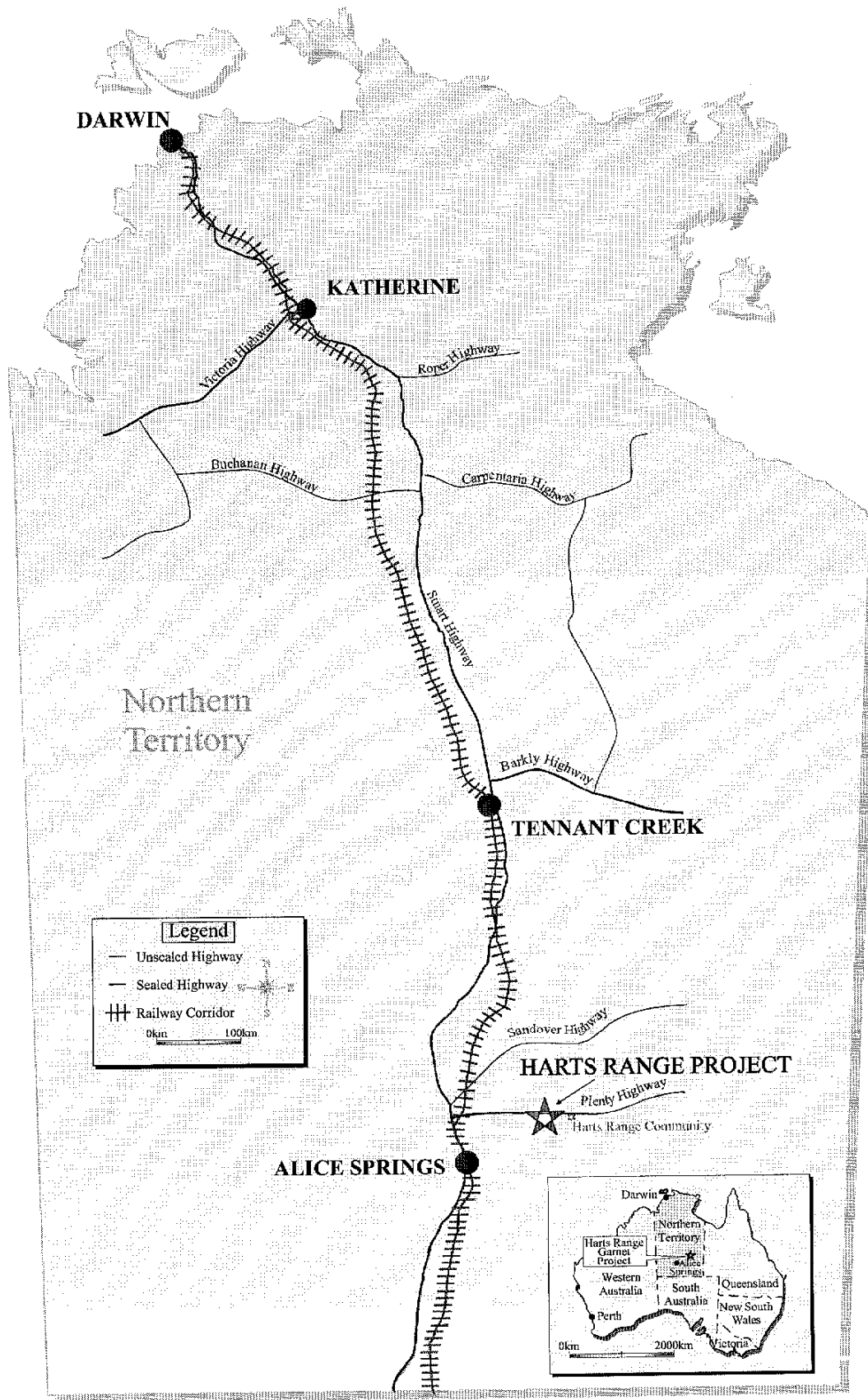


Figure 1

Project Location Map

TENEMENTS

Details of the tenements relevant to the reserves and the Aturga Mine are in Table 2. Tenements held in the area by Olympia are shown on Figure 2. MLA23868 covers that part of EL10150 within which the reserves have been estimated.

Table 2 Olympia's Harts Range Tenements Containing Reserves

| Tenement | Status | Holder/s | Area | AAPA Certificate |
|-----------------|---------------|-----------------------|----------------------|-------------------------|
| EL10150 | Granted | Olympia Resources Ltd | 93km ² | C2000/094 |
| MLA23868 | Application | Olympia Resources Ltd | 25.43km ² | |

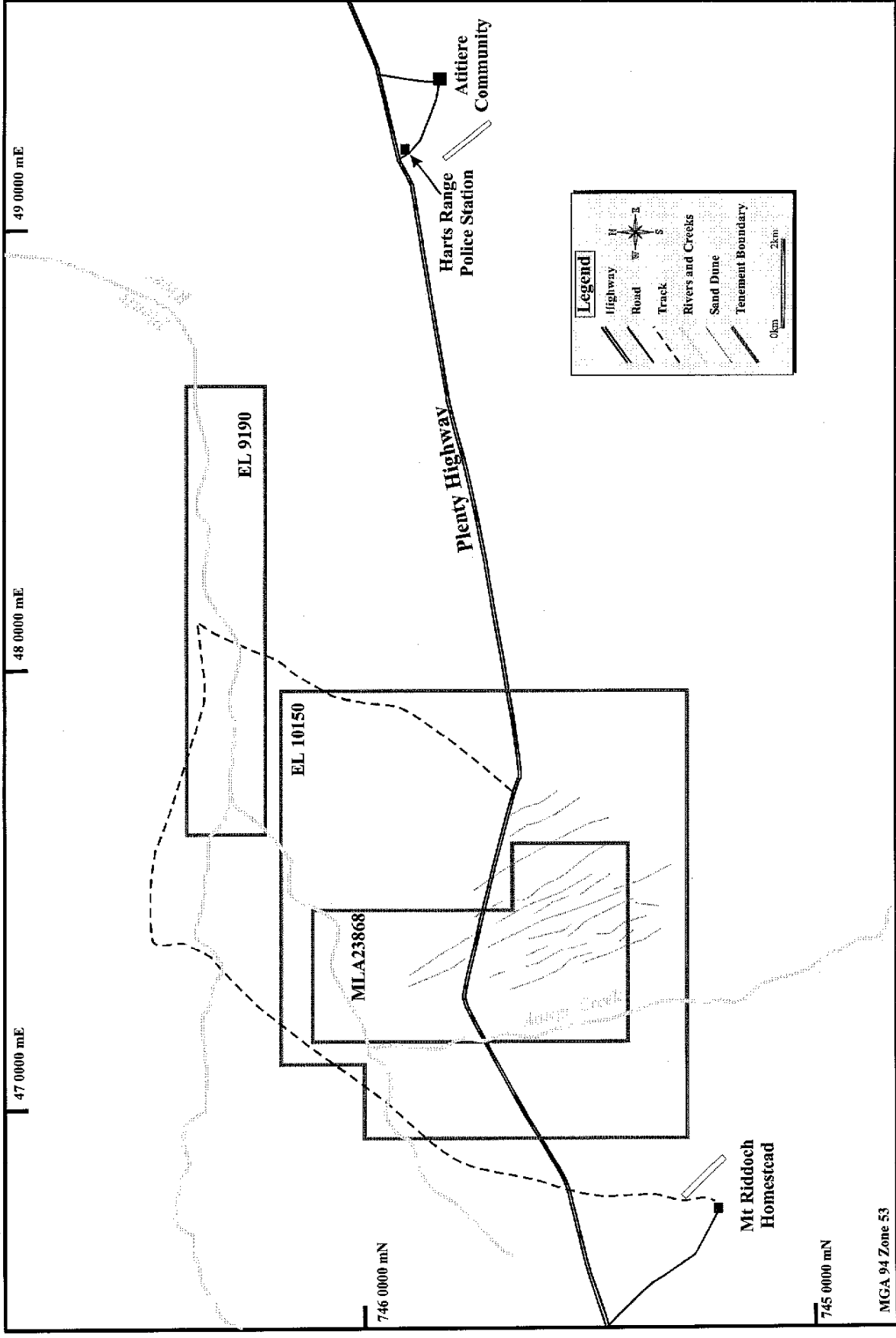


Figure 2 Tenement Location Diagram

GEOLOGY

The geology of the Olympia deposits in the Harts Range has been described by Doepel (2003), who identified the following geological units:

- River Wash: Sands and gravels of the active channels of Aturga Creek and the Plenty River.
- Floodplain Deposits: Consolidated, but unaltered and unlithified, mostly from 1.5 to 4.5m thick.
- Dunes: Fixed sand-dunes, up to 20m thick. They contain carbonate alteration and some lithification, especially towards their base.
- Swales: Between the dunes. They are finer-grained than the dunes and more strongly lithified.
- Paleochannels: Older floodplain and river channel deposits unconformably beneath the floodplain, dune, and swale units. They are lithified and subject to carbonate alteration in part.
- Tertiary Clay: Tertiary clay unconformably underlies the above units. It is known from water bores in the area to be in excess of 100m thick in places. It is cream or green in colour, and contains minor sand grains.

The relationships between the units are shown in Figures 3 and 4. Plan 1 displays geological cross-sections of lines 745 7200N, 745 7000N, 745 6800N, 745 6600N, and 745 6400N. The cross-sections cover the drilling through the floodplain, paleochannel, swale, and dune deposits on these lines.

The river channels, the floodplains, the paleochannels, the swales, and the dunes all contain significant quantities of heavy minerals, dominantly AMH and garnet. These units average 8% garnet, 32% AMH, contained within 44% total heavy minerals in their sand fraction, which comprises between 73 and 80% of each of the units. A detailed examination of the mineralogy has been prepared separately by Baxter *et al* (2003). Figure 6 details the size distributions of the constituent minerals of a dune, a swale, a floodplain, and a paleochannel sample.

Dunes

The various dunes are similar in composition and structure, but not in size. The maximum dune height is >15m (Dune 2 near 745 5200N). The maximum dune thickness is about 20m and the minimum about 2m.

A total of 995 dune samples were analysed. They averaged 1% oversize (>1.7mm), 19% slimes (<90µm), and 43.6% heavy minerals in the sand fraction.

The dunes vary slightly from top to bottom. The upper half of Dune 1 at 745 7000N, for instance, has 17.9% <90µm, 0.1% >1.7mm, and 43.4% heavies in the sand fraction, while the lower half has 20.7% <90 µm, 1.6 % >1.7 mm, and 41.1% heavies in the sand fraction. The low oversize fraction in the upper portion reflects a lack of alteration. The oversize in the lower portions of the dune reflects carbonate alteration and slight lithification.

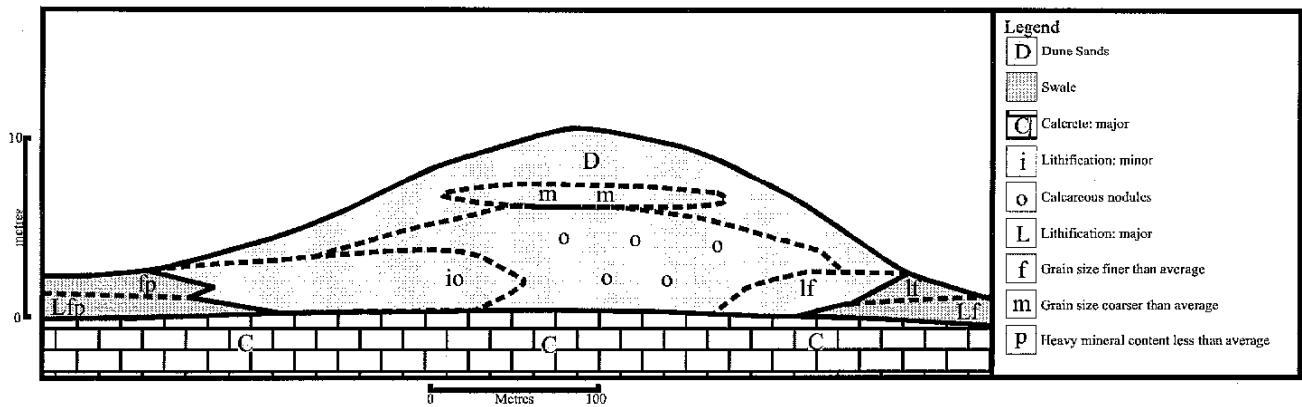


Figure 3 - Dune and Swale Geology - Diagrammatic Section

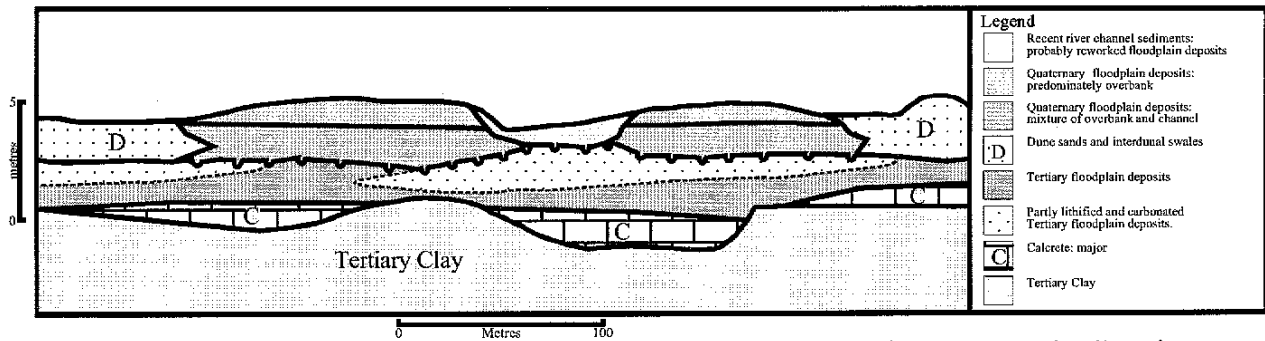


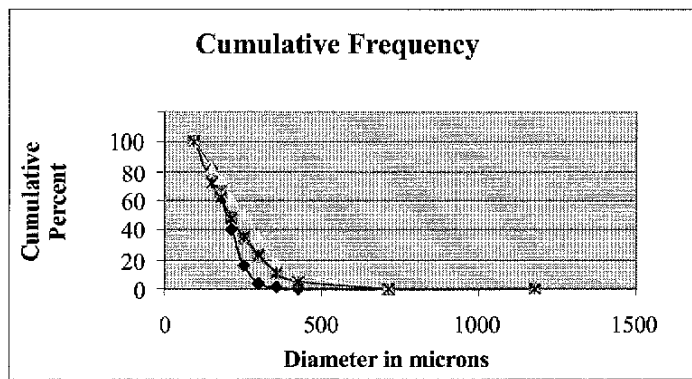
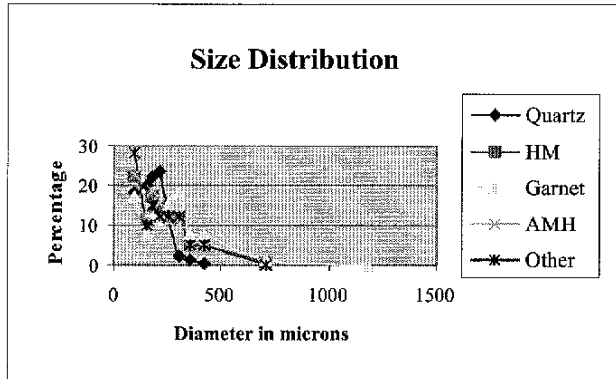
Figure 4 - Floodplain and Paleochannel Geology - Diagrammatic Section



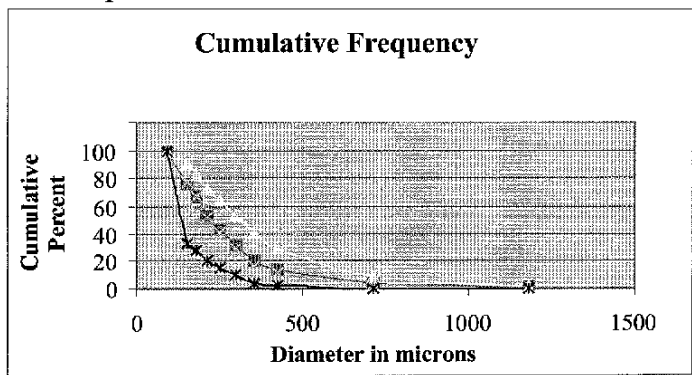
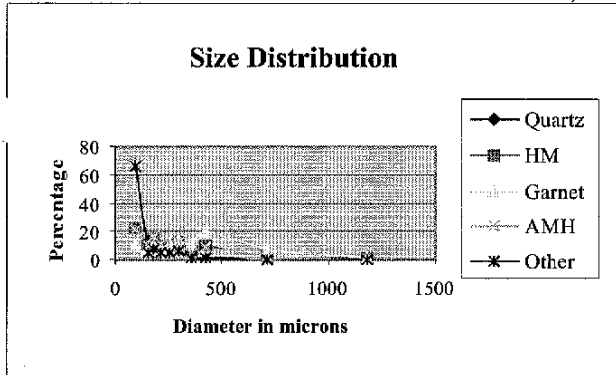
Figure 5 - Costean, showing Unconsolidated Floodplain Sediment over Partly Lithified Palaeochannel Sediment

Figure 3, 4 and 5 - Diagrammatic Sections and Photograph

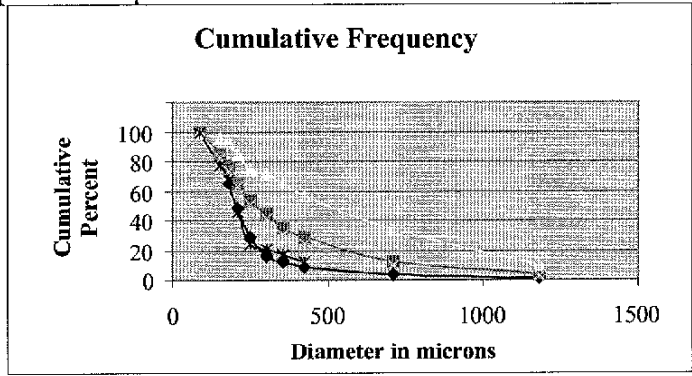
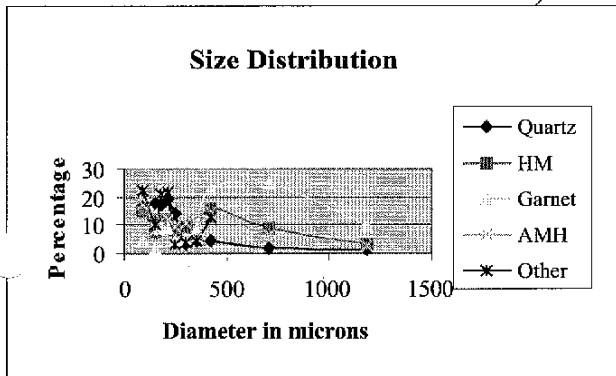
a) Dune Sample



b) Swale Sample



c) Floodplain Sample



d) Palaeochannel Sample

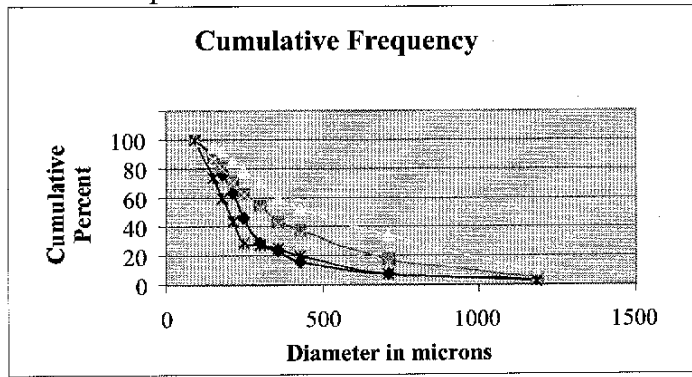
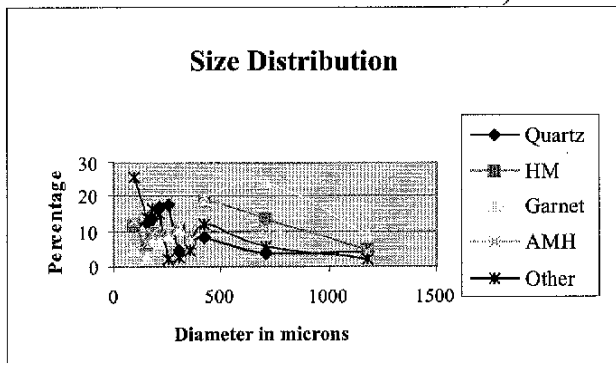


Figure 6

Grain Size Distribution Graphs

The grain size of the dune sand is distributed around about 250µm, with about 90% of it being less than 425µm. It is thus a fine to medium sand in which fine sand dominates. The heavy minerals are more concentrated in the finer sand fractions. The majority of the dune sand is of a uniform grain size distribution, although occasional grain size variations are present. In general, finer grain sizes are present towards the base and edges of the dunes. Some one metre thick bands in the upper portions of the dunes are of slightly coarser grain size.

In general, minor carbonate alteration is present in the lower half of the dunes. It consists of elongate nodules, perhaps related to tree root cavities. Typically the nodules are of one to two cm in size. The nodules consist of sand cemented by calcium carbonate. The intensity of the alteration is minor until the base of the dune, where fine calcium carbonate or calcrete may be present.

Slight lithification is present in the lower portion of the dunes. It consists of clay binding of finer sand layers. The base of the dune assumed when lithification or carbonate exceeded about 20% of the sample. This boundary was usually relatively abrupt. Those holes that were drilled past the boundary did not encounter unaltered dune sand below the boundary.

Swales

The dunes grade into the swales. The swales are also composed of fine- to medium-grained sand, but the finer size is more dominant than in the dunes, the <90µm fraction often exceeding 25%. Typically lithification begins within two metres of the surface and is significant by a depth of four metres.

A total of 50 swale samples were analysed. They averaged 3% oversize, 24% slimes, and 43.2% heavy minerals in the sand fraction.

Floodplain Deposits

The Aturga Creek floodplain deposits are to the east of the present channel of Aturga Creek in the vicinity of the Plenty Highway. Further north they are on both sides of the modern channel. They average about 400m wide and 3m thick. They are composed of poorly bedded sands with minor pebbles. The top 1.5m is uniformly finer than the material below. The majority of the upper portion is medium-grained sand, with a median size of about 350µm. The material also contains about 10% of coarse-grained sand. The lower portion is comprised predominantly of bimodal medium- to coarse-grained sand. The overall grain size tends to increase with depth and, in places, gravel beds are present at the base of the unit. The medium sand has a median size of about 350µm, and the coarse sand of about 1mm (Figure 6). The coarse sand comprises about 20% of the material.

The deposits are consolidated, but unlithified and unaltered. A small creek cuts the deposit to the south of the highway. It follows a band, about 50m wide, of reworked floodplain material. This band, of similar composition to the upper portion of the deposits, is unconsolidated. It is recently reworked floodplain material.

A total of 517 floodplain samples were analysed. They averaged 7% oversize, 17% slimes, and 45.5% heavy minerals in the sand fraction.

Paleochannels

A paleochannel, about 900m in width, is present beneath the Aturga Creek floodplain deposits and the dunes and swales to their east. Its western boundary coincides with the western boundary of the floodplain unit. Paleochannel material is also present beneath the northern Aturga Creek floodplain.

The material is similar to that of the floodplain unit, with the difference that it has been lithified and carbonated. The material, in general, coarsens with depth. In general the finer material is more subject to lithification and carbonate alteration than is the underlying coarser material which can be unaltered. In places, at least two cycles have been recognized. The base of the unit is either strong carbonate alteration, calcrete, or Tertiary clay. An unconformity, recognised in a costean, dug at 47 2230E 475 7200N, is present between the paleochannel material and the overlying floodplain (see photograph, Figure 5). It must also, presumably, be present between the paleochannel material and the overlying aeolian dunes.

During drilling of the Aturga Creek floodplain deposits, it is likely that some paleochannel material was assigned to the floodplain unit.

A total of 329 paleochannel samples were analysed. They averaged 13% oversize, 13% slimes, and 45.0% heavy minerals in the sand fraction.

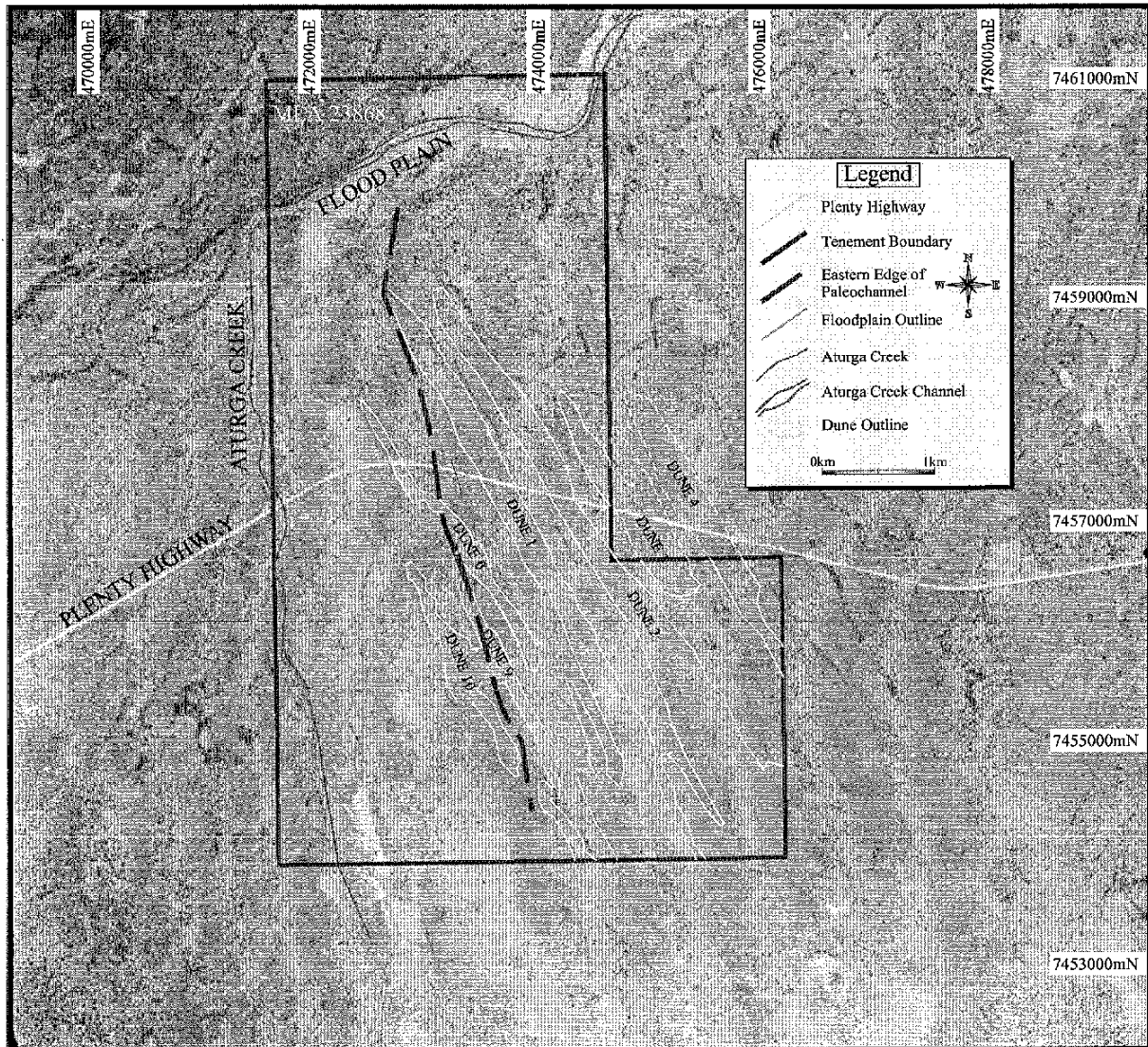
River Wash

The beds of Aturga Creek are composed of sands and gravels, which overlie calcrete or paleochannel material. The bed of Aturga Creek, in its northern east-flowing section, was drilled on three lines. On the 47 3000E line the sands were 100m wide and 3m thick. Minimal trees are present in this section of the river, which is about 5km in length. The garnet content of these sands is higher and the garnets are coarser than those of the floodplain material.

A total of 28 Aturga Creek channel samples were analysed. They averaged 11% oversize, 13% slimes, and 43.4% heavy minerals in the sand fraction.

Topographic Units

The dunes and their intervening swales have been assigned numbered topographic unit names. Their distribution is shown on Figure 7, along with the location of the Aturga Creek floodplain, paleochannel, and modern channel. Dune names go from Dune 0 to Dune 11. Dune 1 is the largest dune, and is in the centre of the dune field. The swales are named according to the dune to their east. Thus Swale 1 is the swale to the west of Dune 1.



MGA 94 Zone 53

Figure 7

Location of Topographical Units

EXPLORATION

Initial exploration of EL10150, in 2001, was restricted to a hand auger programme. The auger holes were up to two metres deep. They tested the dunes, and the swales between them, on four lines.

A far more extensive programme was carried out in 2002. It consisted of an aircore drilling programme of 854 holes, most of which were drilled on EL10150, and the collection of two sets of one tonne bulk samples. The 2002 drilling enabled resources to be estimated for the dunes, floodplains, paleochannels, and modern channels within EL10150 and EL9190.

Exploration in 2003 consisted of the collection of five 25t bulk samples from within EL10150.

The locations of the drill holes from both programmes are shown on Figure 8.

2001 Auger Sampling

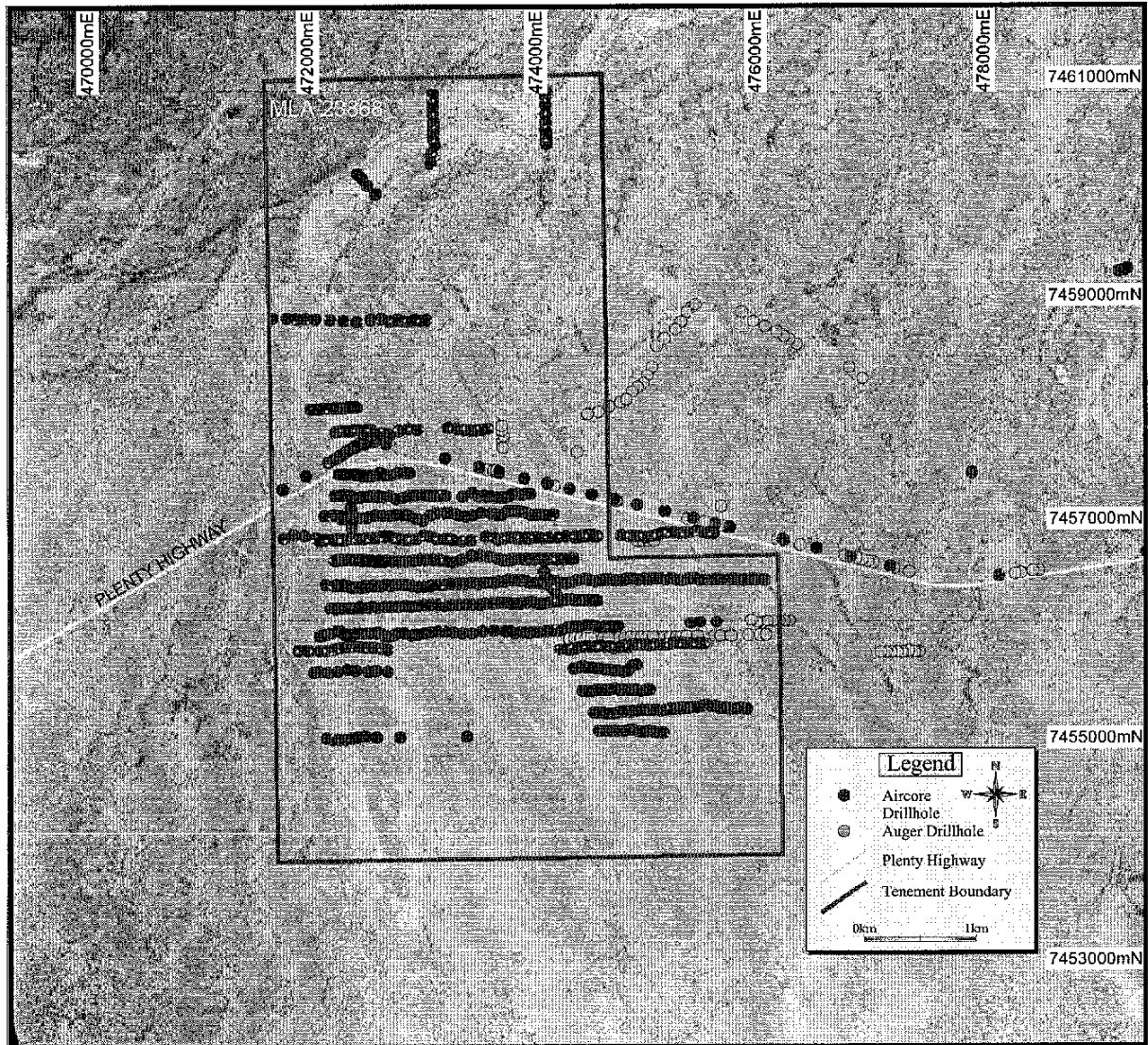
Four traverses of hand auger holes were made across the Riddoch Dunes during 2001, as part of a larger programme that tested a number of areas held in Olympia's Harts Range Garnet Project. A total of 67 holes were drilled to between 0.5 and 2m, including 44 within the area of the estimated reserve. The drill holes were located with a standard GPS using the WGS84 spheroid.

The lines were limited in length and the auger holes were spaced about 50m apart along the lines. Recovery of sample was excellent. Samples collected for analysis were obtained by placing the entire auger sample from each hole on a plastic sheet and cone-and-quartering it. The samples were analysed at AMDEL. The analytical results are included in Appendix 1.

2002 Air Core Drilling

An air core drilling programme was carried out during October and November, 2002. Most of the work was on EL10150, the Mount Riddoch Dune Property. The remainder was on EL9190, the Plenty River Property. The programme was initially designed to sample the dunes to their bases, however at an early stage it was recognised that an extensive garnet bearing flood plain deposit was present adjacent to Aturga Creek within EL10150. Garnet bearing paleochannels were also discovered, beneath the minor dunes to the west of the main dune field. These paleochannels were later recognised to be present in the lower portions of the flood plain deposits; and to the north of the Plenty River in the vicinity of Corkwood Bore, in EL9190. Following these discoveries it was decided that the drilling programme should be amended so as to enable the calculation of the following garnet resources:

1. A measured resource from Dune 1 north to the highway from 745 5200N, a length of 2.7km. The drilling was carried out on a 200m by 40m pattern.
2. A measured resource from the Aturga Creek floodplain deposits. Detailed drilling to enable this to be done was carried out over a length of 2 km on a 200m by 20m pattern.
3. An indicated resource from Dune 0, and from parts of Dunes 1, 2, 3, 4, 9, and 10.
4. An inferred resource from the remainder of the dunes.



MGA 94 Zone 53

Figure 8 Auger and Aircore Drill Hole Locations

5. An indicated resource from the paleochannels, north to the highway from 745 6200N, a distance of about 1.5km.
6. Inferred resources for the floodplain and associated paleochannels north of 745 8200N, a distance of about 6km.
7. An inferred resource for the floodplain and paleochannel deposits on the banks of the Plenty River.
8. An inferred resource for the river wash of Aturga Creek.

Equipment

The drilling programme was performed by Wallis Drilling of Perth, using a Toyota Landcruiser utility mounted Mantis 75 aircore rig. The rig drilled 82mm diameter holes.

Samples

The sample was delivered by a cyclone with an inbuilt splitter. The major portion was allowed to form a single pile beneath the cyclone. The minor portion went into a calico bag. The sample size was usually between 1.2 and 1.5 kg. Samples were generally collected over 1.5m intervals, although paleochannel samples were sometimes collected according to lithology. A total of 3,060 samples, numbered H001 to H3060, were collected. All samples were transported to Western Geochem Laboratories, Bellevue. The assay file, which comprises Appendix 2, contains details of the sample locations. Samples containing significant alteration were not analysed. Nor were basal dune samples of, in general, less than a metre.

Recovery

Recovery was consistently excellent. No drilling difficulties were encountered.

End of Hole

Holes were concluded when significant lithification or carbonate alteration was encountered, except where it was suspected that a less altered paleochannel may be present below. In these areas holes were abandoned at blade refusal (usually on calcrete), or upon encountering the Tertiary clay basement.

Logging

Logging was carried out at the cyclone as the holes were being drilled. Lithological boundaries were logged to, nominally, the nearest 0.1m.

Water

No water was encountered.

Hole Numbers

The holes were given different prefixes, based upon whether they were drilled into dunes or into river deposits, and upon location. This system produced some anomalies.

- Holes RD001-381 were nominally drilled into dunes.
- Holes AC001-444 were nominally drilled into floodplain or paleochannel deposits.
- Holes PR001-011 were drilled into the Plenty River wash.
- Holes RF001-018 were nominally drilled into river flats and paleochannels in the vicinity of the Plenty River and Stones Creek.

Hole Locations

The holes were located with a GPS. Coordinates were recorded in terms of WGS84 coordinates. Details of hole locations are in Appendix 3 and are shown on Plan 2.

Hole R.L.s

R.L.s were based on:

1. The 20m contours taken from 1:100,000 topographic maps. These indicated a downslope to the north over the dune and Aturga Creek floodplain area of about 3.3m per km. It was assumed that the swales and the creek sloped at this rate, and that there was a slope up from Aturga Creek to the swales in the centre of the dune field.
2. Clinometer traverses carried out on foot over Dune 1 on 745 5200N, 745 6600N, and 745 7400N.
3. Jacob's Staff traverses carried out on 745 6400N and 745 7200N.
4. Clinometer traverses carried out from a vehicle along a few other lines.
5. The recorded locations of crests and lows on each line.
6. The assumptions that the R.L. of the significant alteration beneath the dunes occurred at about the same level in any one smaller area. This assumption was borne out on those lines for which clinometer or Jacob's Staff profiles had been constructed.
7. The assumption that the paleochannel deposits occurred at about the same level in any one smaller area.

Using the above information, profiles were created for each line. The lines were tied into each other to keep the general north to south downslope constant.

Hole Spacing

The proven reserves were estimated for portions of the deposits that had been drilled on 200m spaced lines. The drill spacing along the lines varied from unit to unit. In general, it was:

- Dunes 0 and 1: 40m
- Dunes 9 and 10, swale, and underlying paleochannel: 60m
- Floodplain and underlying paleochannel: 20m

The probable reserves were estimated for those portions of the Aturga Creek Floodplain and Channel and of Dune 1 that had been drilled on broadly spaced lines (between 600m and 1200m apart). The drill spacing along the lines varied from unit to unit. In general, it was:

- Floodplain: 60m or 80m
- Channel: 10 to 30m
- Dune 1: 50m

Two detailed "star patterns" were also drilled. One was along and across the crest of Dune 1 centered on 47 3950E 745 6600N. These holes were spaced 25m apart along the dune crest and 20m apart across the dune. The other pattern was drilled into the floodplain and centered at 47 2200E 745 7200N. The holes within it were spaced 10m apart east-west and 20m apart north-south, the potential variability being assumed to be greater across, as against along, the direction of flow of the floods and river channels, which was south to north. No significant variability was observed within any of these units.

Bulk Sampling

Three sets of bulk samples have been collected from the area of the estimated reserve:

- One was collected by hand from a 1.5m deep pit dug into Dune 1 during October 2002.
- Five one tonne bulk samples were collected during November 2002.
- Five 25t samples were collected in May 2003.

Details of the samples are given below in a separate section.

MINERALOGY

The sand sized materials of the floodplain, the paleochannel, the dunes, and the swales that together make up the ore reserves are all comprised of the same mineral suite, listed below by weight percent:

- Quartz - 50-60%, averaging about 56%
- Hornblende (AMH) - 27-37%, averaging about 32%
- Garnet - 6-14%, averaging about 8%
- Ilmenite, minor titanomagnetite and leucoxene: 0.1-4.5%, averaging about 2%
- Biotite, sphene, alumino-silicates, rutile, etc: 1.5-5%, averaging about 2%

These last two groups are classified below as “other heavies”.

The different minerals have different grain size distributions, and thus the proportions of the various minerals vary from fraction to fraction. Tables 3 to 6 detail grain size and mineral distribution for a composite heavy mineral sample from each of the floodplain, paleochannel, dune, and swale units. The figures are derived from grain counts performed by Dunelabs (Hamilton, 2002 and 2003a). The full data set is reproduced in Appendix 4.

Table 3 Grain Size and Heavy Mineral Distribution of Floodplain Composite

| Fraction (>µm) | HM (wt% of total) | Garnet (wt% of total) | AMH (wt% of total) | Other (wt% of total) | HM (cuml wt%) | Garnet (cuml wt%) | AMH (cuml wt%) | Other (cuml wt%) |
|-------------------|-------------------------|-----------------------------|--------------------------|----------------------------|---------------------|-------------------------|----------------------|------------------------|
| 1180 | 3.5 | 9.3 | 2.5 | 0.0 | 3.5 | 9.3 | 2.5 | 0.0 |
| 710 | 9.2 | 24.7 | 6.7 | 0.0 | 12.7 | 34.0 | 9.3 | 0.0 |
| 425 | 16.1 | 23.2 | 14.9 | 12.5 | 28.8 | 57.2 | 24.2 | 12.5 |
| 355 | 6.0 | 8.6 | 5.5 | 4.6 | 34.8 | 65.8 | 29.7 | 17.2 |
| 300 | 9.7 | 5.1 | 11.1 | 4.0 | 44.5 | 71.0 | 40.8 | 21.1 |
| 250 | 8.5 | 4.5 | 9.7 | 3.5 | 52.9 | 75.4 | 50.6 | 24.6 |
| 212 | 12.2 | 8.9 | 12.1 | 21.7 | 65.1 | 84.4 | 62.6 | 46.2 |
| 180 | 12.0 | 8.8 | 11.8 | 21.3 | 77.1 | 93.1 | 74.5 | 67.5 |
| 150 | 7.4 | 2.2 | 8.2 | 10.4 | 84.4 | 95.3 | 82.7 | 77.9 |
| 90 | 15.6 | 4.7 | 17.3 | 22.1 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total | 100.0 | 100.0 | 100% | 100.0 | | | | |

Table 4 Grain Size and Heavy Mineral Distribution of Paleochannel Composite

| Fraction (>µm) | HM (wt% of total) | Garnet (wt% of total) | AMH (wt% of total) | Other (wt% of total) | HM (cuml wt%) | Garnet (cuml wt%) | AMH (cuml wt%) | Other (cuml wt%) |
|-------------------|-------------------------|-----------------------------|--------------------------|----------------------------|---------------------|-------------------------|----------------------|------------------------|
| 1180 | 4.8 | 8.7 | 3.9 | 2.0 | 4.8 | 8.7 | 3.9 | 2.0 |
| 710 | 13.2 | 24.1 | 10.9 | 5.5 | 17.9 | 32.8 | 14.8 | 7.5 |
| 425 | 18.6 | 19.3 | 19.0 | 12.1 | 36.6 | 52.2 | 33.8 | 19.7 |
| 355 | 6.9 | 7.2 | 7.0 | 4.5 | 43.5 | 59.3 | 40.9 | 24.2 |
| 300 | 10.9 | 10.7 | 11.6 | 2.4 | 54.4 | 70.1 | 52.5 | 26.6 |
| 250 | 9.0 | 8.8 | 9.6 | 2.0 | 63.4 | 78.9 | 62.1 | 28.5 |
| 212 | 8.8 | 6.9 | 8.7 | 15.1 | 72.1 | 85.8 | 70.8 | 43.6 |
| 180 | 9.5 | 7.5 | 9.5 | 16.4 | 81.6 | 93.3 | 80.3 | 60.0 |
| 150 | 6.4 | 2.4 | 6.9 | 14.0 | 88.0 | 95.6 | 87.2 | 74.0 |
| 90 | 12.0 | 4.4 | 12.8 | 26.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | | | | |

Table 5 Grain size and Heavy Mineral Distribution of Dune Composite

| Fraction (>µm) | HM (wt% of total) | Garnet (wt% of total) | AMH (wt% of total) | Other (wt% of total) | HM (cuml wt%) | Garnet (cuml wt%) | AMH (cuml wt%) | Other (cuml wt%) |
|-------------------|-------------------------|-----------------------------|--------------------------|----------------------------|---------------------|-------------------------|----------------------|------------------------|
| 1180 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 |
| 710 | 0.4 | 1.4 | 0.2 | 0.1 | 0.4 | 1.6 | 0.2 | 0.1 |
| 425 | 5.1 | 7.8 | 4.5 | 5.2 | 5.5 | 9.4 | 4.7 | 5.3 |
| 355 | 5.1 | 7.7 | 4.4 | 5.2 | 10.6 | 17.1 | 9.1 | 10.5 |
| 300 | 12.0 | 18.4 | 10.6 | 12.3 | 22.6 | 35.6 | 19.7 | 22.8 |
| 250 | 11.7 | 15.6 | 10.8 | 12.1 | 34.3 | 51.2 | 30.5 | 34.9 |
| 212 | 14.5 | 10.4 | 15.5 | 12.3 | 48.8 | 61.6 | 46.1 | 47.3 |
| 180 | 17.4 | 12.5 | 18.7 | 14.8 | 66.2 | 74.2 | 64.7 | 62.0 |
| 150 | 11.5 | 8.3 | 12.4 | 9.8 | 77.7 | 82.5 | 77.1 | 71.8 |
| 90 | 22.3 | 17.5 | 22.9 | 28.2 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | | | | |

Table 6 Grain Size and Heavy Mineral Distribution of Swale Composite

| Fraction (>µm) | HM (wt% of total) | Garnet (wt% of total) | AMH (wt% of total) | Other (wt% of total) | HM (cuml wt%) | Garnet (cuml wt%) | AMH (cuml wt%) | Other (cuml wt%) |
|-------------------|-------------------------|-----------------------------|--------------------------|----------------------------|---------------------|-------------------------|----------------------|------------------------|
| 1180 | 0.7 | 1.7 | 0.5 | 0.0 | 0.7 | 1.7 | 0.5 | 0.0 |
| 710 | 3.1 | 7.7 | 2.4 | 0.5 | 3.8 | 9.4 | 2.9 | 0.5 |
| 425 | 10.2 | 19.5 | 8.9 | 1.8 | 14.0 | 28.9 | 11.8 | 2.3 |
| 355 | 6.1 | 11.7 | 5.3 | 1.1 | 20.0 | 40.6 | 17.1 | 3.3 |
| 300 | 12.4 | 13.4 | 12.7 | 6.5 | 32.4 | 54.0 | 29.9 | 9.8 |
| 250 | 10.4 | 11.3 | 10.7 | 5.5 | 42.8 | 65.3 | 40.6 | 15.3 |
| 212 | 10.2 | 7.4 | 11.3 | 5.4 | 53.0 | 72.8 | 51.9 | 20.7 |
| 180 | 14.4 | 10.5 | 15.9 | 7.6 | 67.4 | 83.3 | 67.8 | 28.4 |
| 150 | 9.6 | 7.0 | 10.6 | 5.1 | 77.0 | 90.3 | 78.4 | 33.5 |
| 90 | 23.0 | 9.7 | 21.6 | 66.5 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | | | | |

For all composites examined, the coarser fractions have a larger garnet to AMH ratio than do the finer fractions. The “other heavies” tend to be concentrated in the finer fractions.

AMH Content

The methodology used for the calculation of AMH in each block of ore was to:

1. Calculate an average HM% for each block
2. Subtract the assigned “garnet %” for each block
3. Subtract an “other heavies %”, based upon the ore type.

Hamilton (2003a) carried out grain counts on a number of sized and weighed fractions of heavy mineral composites. The counts were carried out on five or six separate size fractions. The counts were adjusted for the S.G.’s of the minerals and the weight of each fraction. The weights of “other heavies” in the composites were:

- Floodplain: 5.6%, 6.0%,
- Paleochannel: 4.0%, 5.5%
- Dune: 5.7%, 4.6%
- Swale: 6.9%

The averages of these results have been used for the assumed other heavies for each ore type, as follows:

- Floodplain: 5.8%
- Paleochannel: 4.75%
- Dune: 5.15%
- Swale: 6.9%

For those units for which determinations are not available the following figures have been used:

- Combined floodplain and paleochannel: 5.3%
- River channel: 4.75%

Mineral Analyses

Two samples of AMH were analysed by Ultra Trace. Three samples of garnet were analysed by Genalysis Laboratory Services, who also analysed the Na₂O contents of the AMH samples. The average results are reported in Table 7.

Table 7 Analyses of AMH and Garnet

| Oxide | AMH Average % | AMH Range - % | Garnet Average % | Garnet Range - % |
|--|------------------|------------------|---------------------|---------------------|
| SiO ₂ | 45.75 | 45.5-46.0 | 40.6 | 40.4-40.9 |
| Al ₂ O ₃ | 11.0 | 11.0-11.1 | 20.3 | 20.26-20.44 |
| Fe ₂ O ₃ | 3.0 | 3.01-3.06 | NR | |
| FeO | 12.7 | 12.5-12.9 | NR | |
| <i>Fe (total as Fe₂O₃)</i> | 17.2 | 16.9-17.4 | 33.1 | 32.84-33.27 |
| MnO | 0.27 | 0.26-0.28 | 1.76 | 1.62-1.85 |
| MgO | 11.25 | 11.1-11.4 | 5.8 | 5.63-6.04 |
| CaO | 11.0 | 11.0-11.0 | 3.0 | 2.8-3.1 |
| Na ₂ O | 1.63 | 1.58-1.67 | NR | |
| K ₂ O | 0.43 | 0.426-0.431 | NR | |
| TiO ₂ | 1.52 | 1.41-1.62 | 0.38 | 0.26-0.50 |
| Cr ₂ O ₃ | 0.05 | 0.053-0.054 | NR | |
| V ₂ O ₅ | 0.07 | 0.07 | NR | |
| ZrO ₂ | 0.025 | 0.02-0.03 | NR | |
| ZnO | 0.02 | 0.02 | NR | |
| Nb ₂ O ₅ | <0.001 | <0.001 | NR | |
| P ₂ O ₅ | 0.04 | 0.033-0.048 | NR | |
| As | NR | | <0.01 | <0.01 |
| SO ₃ ⁻ | <0.01 | <0.01 | NR | |
| Th | <0.001 | <0.001 | NR | |
| U | <0.001 | <0.001 | NR | |
| LOI | 0.58 | 0.58-0.58 | NR | |

Mineralogical Examinations

Clarke (2003) examined samples of amphibole and garnet concentrates from the deposits.

His description of the amphibole concentrate was:

"The sample consists predominantly of a dark brown to greenish-brown calcium amphibole of magnesio-hornblende composition.....

Impurities detected in the hornblende concentrate, at levels estimated to be below 1 percent each, include pale brown orthorhombic amphibole of anthophyllite (or possibly gedrite) composition and pale brown monoclinic amphibole of cummingtonite (or possibly magnesio-cummingtonite) composition. These minerals are similar in colour and refractive index and are difficult to differentiate optically except by extinction angle. The anthophyllite has a much higher content of aluminium. Neither is asbestiform. In addition to these impurities there are trace amounts of garnet, epidote and dark mica. No quartz was detected using XRPD."

His description of the garnet concentrate was:

"The sample consists predominantly of garnet of manganoan almandine composition....

The impurities are (in order of abundance) dark brown amphibole (probably magnesio-hornblende), epidote, pale brown monoclinic amphibole (probably mostly cummingtonite), quartz, suspected ilmenite and mica."

No fibrous minerals were identified that would prevent the garnet and AMH being used in filtration, water softening or blast industries.

Hamilton (2003b) carried out S.G. determinations of "pure" hand-sorted >0.7mm garnet and AMH samples. His results were:

- Garnet: 4 samples; range 3.98 - 4.07; average S.G. 4.03
- AMH: 3 samples; range 3.25 - 3.37; average S.G. 3.29

HEAVY MINERAL ANALYSES

The samples from the 2001 auger drilling programme were sent to AMDEL in Adelaide for heavy mineral analysis. Standard samples were submitted. The heavy mineral content was determined by TBE separation on the <1mm >75µm fraction. The analytical results are detailed in Appendix 2.

The samples from the 2002 aircore drilling programme were submitted to Western Geochem Laboratories in Perth. No standard samples were submitted but repeat analyses were conducted routinely. The samples were sized to >1.7mm, 1.7mm to 90µm, and <90µm. TBE heavy mineral separations were conducted on the <1.7mm >90µm fraction. The analytical results are detailed in Appendix 1.

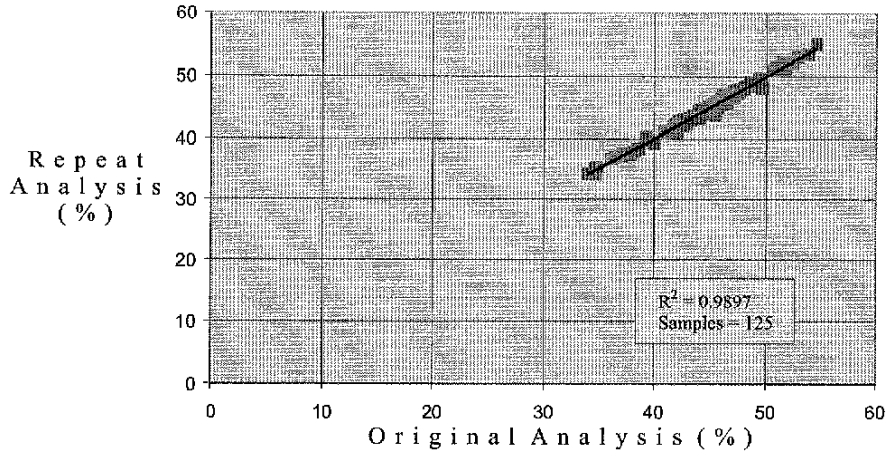
Inter-Laboratory Comparison

The heavy mineral analyses of samples taken from Dune 1 during the 2001 auger drill programme were compared with the those from the top samples from the aircore holes drilled in 2002. Those taken in 2001 were from the top 0.5m to 2m of the dune and those in 2002 were from the top 1.5m. A total of 18 of these samples were analysed by AMDEL in 2001. They averaged 45.0% heavy minerals. A total of 112 of these samples were analysed by Western Geochem Laboratories. They averaged 45.6% heavy minerals.

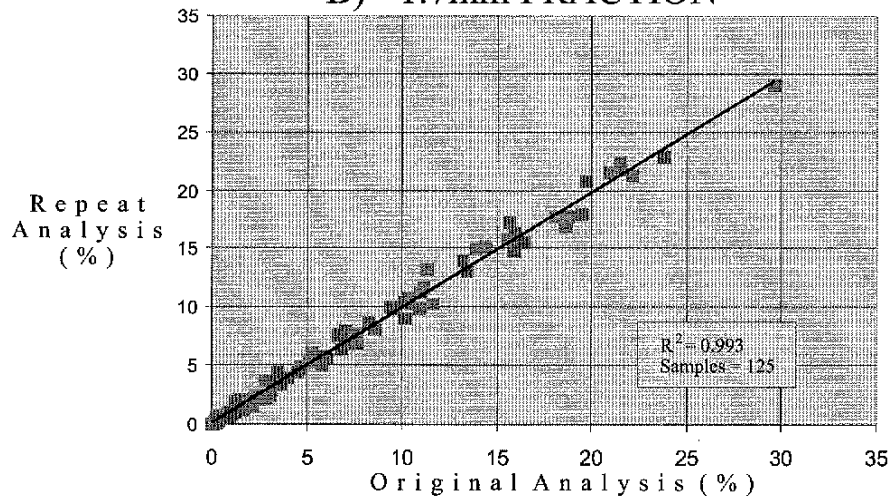
Intra-Laboratory Repeats

Repeat analyses were routinely performed by Western Geochem Laboratories. From the total of 1978 analysed samples 125 repeat analyses were performed. Figure 9 contains graphs comparing the original and repeat analyses.

A) HEAVY MINERAL FRACTION



B) >1.7mm FRACTION



C) <90 MICRON FRACTION

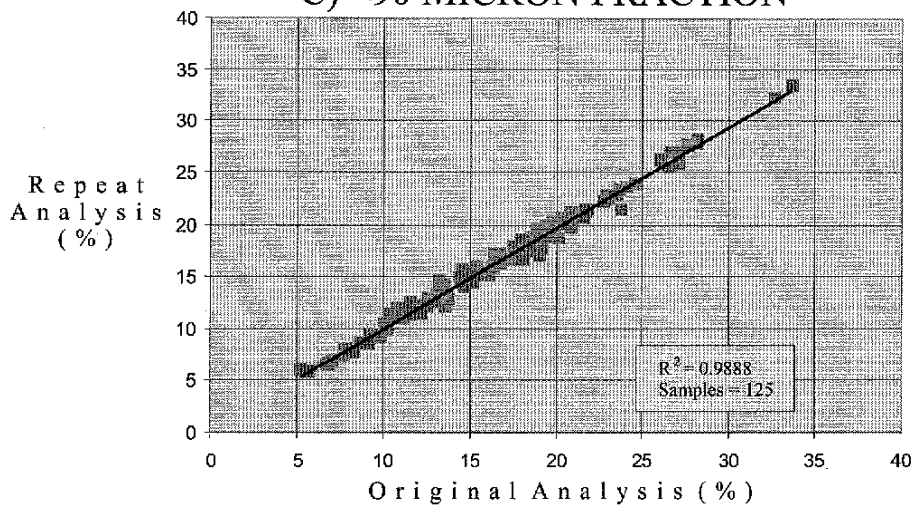


Figure 9

Original Vs Repeat Analyses

GARNET SEPARATIONS

The garnet content of the heavy mineral fraction of the sands was determined by various methods, as detailed by Baxter *et al* (2003). The methods were:

- Hand sorting with rare earth magnets
- Gravity sorting on a Wilfey Table
- Grain counting of various size fractions
- S.G. separation in methyl iodide liquid (MI)

It was found that the most accurate and efficient method was MI separation. Detailed grain counts were performed by Hamilton (2003a) on ten separate size fractions of four heavy mineral composites, which were also separated by MI. The grain counts gave an average garnet content of 18.1%. The MI separations gave an average of 18.4%. The MI %garnet value is slightly overstated, owing to the presence of minor ilmenite and other oxides in the “garnet sink”. They occur predominantly in the finer fractions.

A total of 48 composite heavy mineral samples from within EL10150 had their garnet contents determined by MI separation. The heavy mineral sinks making up each composite were selected so as to reflect the average composition of the unit from which they were taken. Between 1 and 11 sinks were combined to make up each composite. The results are summarised in Table 8, details are in Appendix 5, and sample locations are shown on Figure 10.

Table 8 Heavy Mineral Garnet Contents by MI Separation

| Ore Type | Composites (No.) | % Garnet in HM (Range) | % Garnet in HM (av.) |
|---|---------------------|---------------------------|-------------------------|
| Dune | 22 | 14.0 – 23.8 | 18.1 |
| Floodplain | 5 | 15.1 – 18.8 | 17.1 |
| Paleochannel | 5 | 16.1 – 24.6 | 19.4 |
| Combined floodplain and paleochannel | 13 | 16.9 – 35.2 | 22.8 |
| Aturga Creek channel | 1 | 29.8 | 29.8 |
| Swale | 2 | 16.4 - 19.6 | 18.0 |

In general, it appears that the coarser materials have a higher garnet content of their heavy minerals than do the finer materials. This accords with the fact that within individual samples the coarser fractions have higher garnet contents. In addition the garnet content of the samples analysed appears to vary geographically within the ore types (see Figure 10):

- The heavy minerals of the floodplain and paleochannel have higher garnet proportions downstream (to the north and then east) than upstream.
- The heavy minerals of the dunes have a less obvious trend, which is also for higher garnet contents to the north and east.
- The heavy minerals of the river channels also, on the basis of only three samples, appear to become richer in garnet downstream. The Aturga Creek channel has a heavy mineral content of 29.8% garnet and the Plenty River channel, about 9km downstream has an average content of 48.9% garnet.

The geographic trends in the garnet content of the heavy minerals of the various ore types were taken into account when allocating “%garnet in HM” values for each ore type in each reserve block or unit. The allocations of these values are shown on Figure 10.

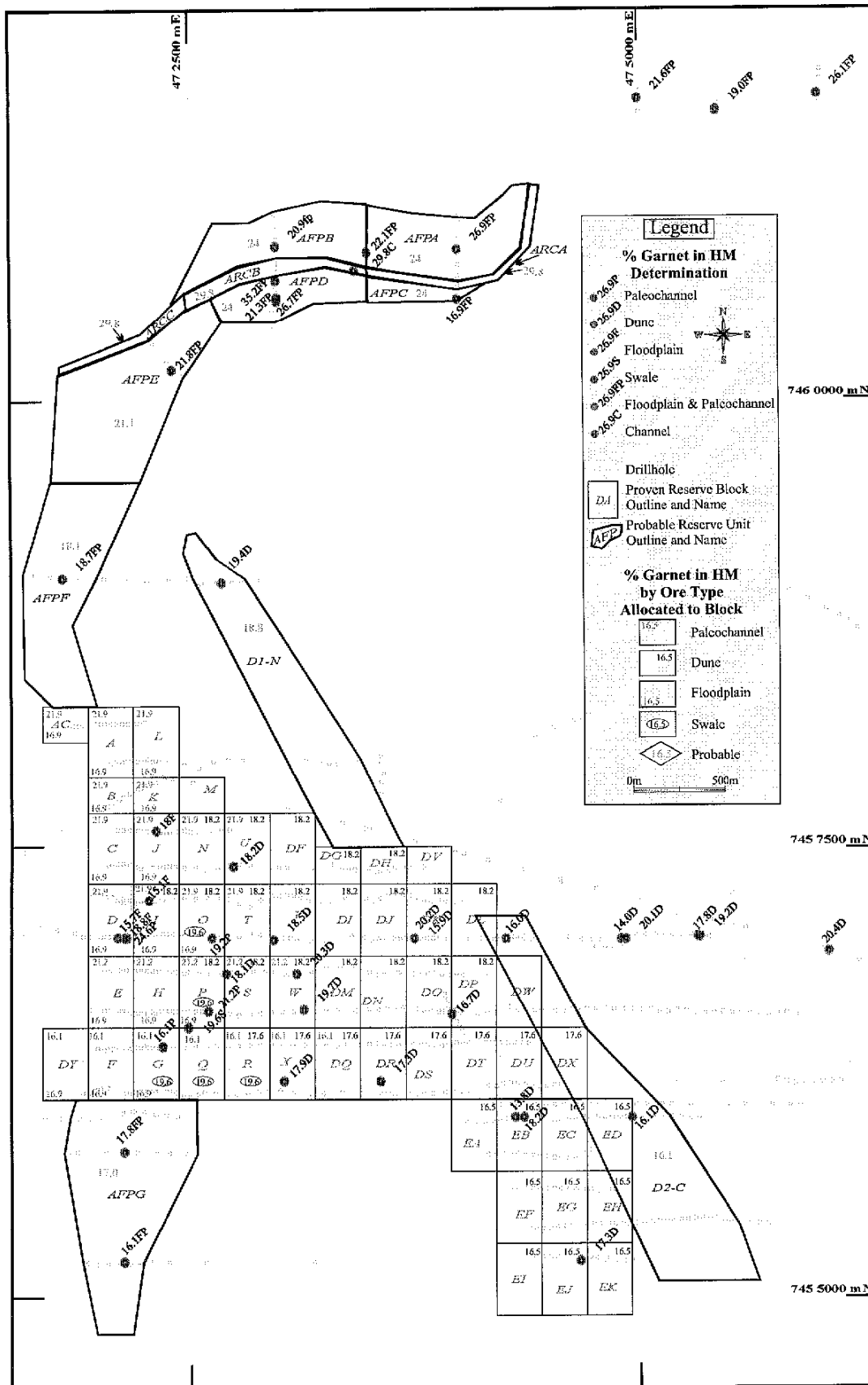


Figure 10: Riddoch Project - Olympia Resources Ltd. % Garnet Content in Heavy Mineral

***IN SITU* BULK DENSITY**

Two *in situ* bulk density determinations were carried out on near surface sand from Dune 1, and two on floodplain material. The determinations were carried out in the walls of trenches and costeans. The trenches and costeans were filled in after the determinations had been carried out. In each case a platform was dug in the wall and a cylinder was driven into the sand beneath the platform. The distance that the cylinder was driven down was measured. A steel plate was then driven horizontally beneath the sand filled cylinder to form a floor for the material in the cylinder. The cylinder was then dug out of the sand. The sand inside the cylinder was weighed. Details of the calculations and the locations of the samples are given in Appendix 6. The results obtained were:

- Dune: 1.85 +/- 0.10 gm/cc
- Dune: 1.94 +/- 0.10 gm/cc
- Floodplain: 1.76 +/- 0.13 gm/cc
- Floodplain: 1.73 +/- 0.13 gm/cc

Please note: For convenience, from here on in this report, the *in situ* bulk density is referred to as S.G. and the values have no units attached.

The S.G.'s used for the various units in the reserve estimations were:

- Floodplain: 1.73
- Paleochannel: 1.73
- Dune: 1.85
- Swale: 1.79
- Creek channel: 1.60
- Waste: 1.70

BULK SAMPLING

October 2002 Sampling

In October 2002, four samples were collected by hand from pits up to 1.5m deep for preliminary bulk testing. Two samples were collected from the channel wash of the Plenty River, and one sample each from Dune 1 and Dune 3 on the south side of the Plenty Highway.

No processing was undertaken on these samples as drilling in November revealed the resource along Aturga Creek.

November 2002 Sampling

Five one tonne bulk samples were collected and submitted to Lakefield Orestest, Kewdale. Two sampled Dune 1, and three sampled the floodplain. Details are:

Sample HRD1: From the crest of Dune 1 at 47 3495E, 475 7370N. The sample was obtained by drilling multiple aircore holes to a depth of 7.5 m and feeding the sample into a bulkabag. The sample came from near holes RD226 and BD5 and from near samples H1308 to 1312 and BD9 to 10. The sample was of fine- to medium-grained dune sand. It contained minor clay lithification.

Sample HRD2: From the crest of Dune 1 at 47 3960E, 475 6580N. The sample was obtained by drilling multiple aircore holes to a depth of 12 m and feeding the sample into a bulkabag. The sample came from near holes RD183 and BD3 and from near samples H819 to 826 and BD5 to 6. The sample was of fine- to medium-grained dune sand.

Sample HRC1: From the Aturga Creek floodplain at 47 2200E, 475 7405N. The sample was obtained by digging a costean (Costean 1) with a front-end loader to a depth of 1.5 m and shoveling from the loader's bucket into a bulkabag. The sample was dug from near hole AC150 and sample H1611. The sample was of consolidated flood-plain material. The dominant grain size was fine to medium, but some coarse-grained sand and gravel was present.

Sample HRC2: From the Aturga Creek floodplain at 47 2200E, 475 7405N. The sample was obtained by deepening Costean 1 with a backhoe to a depth of 3.7 m. It was shoveled from the backhoe's bucket into a bulkabag. The sample was dug from near hole AC150 and samples H1612-13. The sample was of consolidated flood-plain material. The dominant grain size was medium to coarse. Some gravel was present.

Sample HRC3: From the Aturga Creek floodplain at 47 2230E, 475 7200N. The sample was obtained with a backhoe from Costeans 2 and 3. It was shoveled from the backhoe's bucket into a bulkabag. Costean 2 was dug near hole AC132 and Costean 3 near hole AC441. A combination of samples H1558, 1559, and 3052 should be similar to the bulk sample. The sample was predominantly of free flowing unconsolidated coarse sands and minor gravel derived from reworking of the floodplain material. About 20% of the sample was of fine- to medium-grained heavy-mineral-poor material that was in part strongly carbonated and lithified. This material is from the upper portion of a paleochannel.

May 2003 Sampling

In May 2003, a campaign of bulk sampling was conducted in order to obtain sufficient material to produce market samples. Five pits were dug with a large excavator to a depth of about 5m. All samples were about 25t. The samples were taken to Alice Springs and stored in Kwickcon's yard. A portion of each sample was transported to Lakefield Oretest in Perth.

Sample 1: The sample was collected from a pit 50m south of the Plenty Highway at 47 2362E, 745 7590N. The pit was 5.2m deep and passed through both floodplain and palaeochannel to a calcrete base. The sample came from near hole AC214.

Sample 2: The sample was collected from a pit located in Dune 0 at 47 2470E, 745 7400N. The sample consists of 2.5m of dune sand and 2.4m of palaeochannel sand over a calcrete base. It is adjacent to hole AC163.

Sample 3: The sample was collected from a 5m deep pit located in the Aturga Creek Floodplain at 47 2083E, 745 7224N. The sample was comprised of approximately equal proportions of floodplain and palaeochannel sand. The closest hole is AC138.

Sample 4: The sample was collected from a pit located in the Aturga Creek Floodplain at 47 2233E, 745 7013N. It is almost entirely of floodplain material, with about 0.3m of palaeochannel material from the base of the pit. It is near hole AC031.

Sample 5: The sample was collected from a pit located in the Aturga Creek Floodplain at 47 2320E, 745 7020N, near hole AC029. The pit contained 1.5m of floodplain material above a layer of calcrete.

A composite 19t bulk sample was prepared by combining equal portions of samples 3 and 4. It was processed in Perth by Lakefield Oretest, who produced a number of marketing samples.

RESOURCE STATEMENT

The resource statement prepared by CRM (Baxter and Doepel, 2003) estimated garnet resources, within a number of Olympia's Harts Range Garnet Project licence areas. The majority, but not all, of the resources were within EL10150. The statement did not include AMH in the resources.

The estimated resources from EL9190 and EL10150 are tabulated below in Table 9.

Table 9 Summary of Resources – Harts Range Garnet Project EL9190 & EL10150

| Unit | Sand (t) | HM (% of sand) | Heavy Minerals (t) | Garnet (% of sand) | Garnet (t) |
|-------------------------|-------------------|----------------------|--------------------------|--------------------------|------------------|
| MEASURED | | | | | |
| Floodplain | 2,814,309 | 46.2 | 1,229,473 | 6.5 | 183,137 |
| Palaeochannel | 3,912,483 | 41.0 | 1,727,400 | 9.3 | 364,618 |
| Dune 1 | 12,042,998 | 43.2 | 5,205,172 | 7.7 | 923,915 |
| Total | 19,000,000 | 43 | 8,000,000 | 7.8 | 1,500,000 |
| INDICATED | | | | | |
| Floodplain | 11,186,739 | 44.1 | 4,928,517 | 8.6 | 961,808 |
| Dunes | 19,814,836 | 42.1 | 8,338,066 | 7.6 | 1,501,227 |
| Total | 31,000,000 | 43 | 13,000,000 | 7.9 | 2,500,000 |
| INFERRED | | | | | |
| Aturga Floodplain | 3,329,719 | 41.4 | 1,379,879 | 10.8 | 357,862 |
| Aturga Creek Channel | 540,702 | 45.1 | 243,586 | 13.6 | 73,710 |
| Plenty River Floodplain | 3,382,884 | 31.9 | 1,077,344 | 6.0 | 201,876 |
| Plenty River Channel | 1,046,117 | 36.1 | 377,310 | 16.0 | 167,379 |
| Dunes | 6,999,645 | 42.7 | 2,897,958 | 8.1 | 568,860 |
| Total | 15,000,000 | 39 | 6,000,000 | 9.0 | 1,400,000 |
| GRAND TOTAL | 65,000,000 | | 27,000,000 | | 5,300,000 |

Note: Totals are rounded appropriately

MINING

The feasibility study completed by HBH (Crawford *et al*, 2003) assumed the following mining sequence:

- Line clearing and grade control drilling as required
- Pit design and planning – mining to be carried out on an approximately 160m wide mine face with approximately 80m from the crest of the ore face to the toe of the pit.
- Diversion, or bunding, of Aturga Creek
- Removal of topsoil over initial mining area and initial tailings area by rubber tyred front end loader
- Mining
- Trucking to the wet plant
- Return of fines (<150µm), oversize (>1.7mm), <150µm sand and light quartz-rich fraction to pit
- Immediate rehabilitation of the waste filled pit

The same loader is expected to be used for all of the above activities in the initial year.

In the first five years of operation the trucking distance is not planned to exceed 1.2km. All reserves are located within a radius of 4km from the proposed plant site.

Mining is expected to be relatively simple with an easily identifiable calcrete or claystone base to the paleochannel ore, and a base to the dunes distinguishable both by visual means and by RL. Almost all of the material from the surface to the base contains heavy minerals and will be processed. The exception is some lenses of easily identifiable white calcrete within the paleochannel. Those that were intersected by the aircore drilling have been identified on section as areas of waste and are estimated to total 120,000m³ (210,000t) of material. The waste will be left in the pit or used as roadbase. There is not expected to be any significant dilution of the ore.

Detailed grade control is not expected to be required, as the materials making up the ore reserves do not differ significantly in grade within any one unit and no low grade sections were encountered during their drilling. Mine scheduling will, however, have to take into account the fact that there are differences between the grain size profiles of the garnet and AMH from the floodplain, the paleochannel, and the dune deposits.

It is expected that a small proportion of the resource will not be recovered, for the following reasons:

- A very small proportion of the reserve may be lost to protect mature trees, as directed by the environmental consultants. Mining to within a few metres of the trunk of eucalypts should not adversely affect them, as they rely on deep, rather than surface spreading, root systems (Trudgen, *pers com*). No attempt has been made in the reserve estimations to quantify the amount of potential ore that may be lost to mining in order to preserve trees.
- The topsoil layer will not be processed, but will be used for rehabilitation. The thickness of the retained layer will be less than 10cm and is expected to average about 5cm. Perhaps 2% of the floodplain material, 1% of the dune material, and none of the buried paleochannel material will be affected. Appropriate proportions of the resource have been subtracted in the reserve estimations.

- The wet processing plant is to be sited within the area of the reserves, probably on dune material over paleochannel. The plant is expected to cover a 100m square site, the northwestern corner of which is at 745 7000N 47 2400E. The volume of dune sand beneath this site is 20,000m³, and of paleochannel, 18,000m³. These volumes have not been included in the reserve estimates.

PROCESSING

HBH and Lakefield Orestest carried out testwork on bulk samples of ore from each of the dunes, floodplain, and palaeochannel (Falconer, 2003; Ingram, 2003). They concluded that:

- The heavy mineral fraction can be separated from the quartz by the use of hydrosizers and spirals
- At grain sizes $>425\mu\text{m}$ garnet can be separated from the other heavy minerals (predominantly AMH) by the use of rare earth drum magnets
- Within the $250\text{--}425\mu\text{m}$ fraction the separation of garnet from AMH is less successful
- At grain sizes $<250\mu\text{m}$ the separation of garnet from AMH is very difficult

HBH thus proposed that the $<250\mu\text{m}$ heavy mineral concentrate be stockpiled and that only the coarser fractions of the heavy mineral concentrates be separated into various products.

In March 2003, Olympia identified that a blend of 10-20% garnet and 80-90% AMH, which they named garnetblende, has similar blasting properties to slags currently being used for surface preparation blasting. It, however, has the advantage over the slag that it is non-toxic. Preliminary investigations suggest that it will be saleable.

SGS-Lakefield Orestest are in the process of conducting further testwork to determine what range of AMH and garnet products will be able to be produced from the $>250\mu\text{m}$ heavy mineral concentrate. Indications to date are that the following products can be made (Ingram, 2003):

- $>710\mu\text{m}$ garnet (containing 93 % garnet, 5% AMH, $<1\%$ quartz)
- $>710\mu\text{m}$ garnetblende (containing 18% garnet, $<2\%$ quartz)
- $250\text{--}710\mu\text{m}$ garnet (containing 85% garnet, 9% AMH, $<1\%$ quartz)
- $250\text{--}710\mu\text{m}$ garnetblende (containing 15% garnet, $<2\%$ quartz).

Ingram predicts that recoveries of garnet and AMH $>250\mu\text{m}$, as a percentage of the total amounts of garnet and AMH $>90\mu\text{m}$, are likely to be:

- Floodplain paleochannel mix(40:60): Garnet 59%; AMH 38%
- Dune: Garnet 46%; AMH 30%

The lower recovery percentages of the AMH and of the dune garnet are largely a function of the fact that lower proportions of them are $>250\mu\text{m}$ in grain size.

For both garnet and AMH the grain size distribution is coarser in the paleochannel material than in the floodplain material, and in the swale material than in the dune material (Hamilton, 2003a). Based on the recovery figures given above and the grain size distributions, it is suggested that the recoveries for the separate ore types are likely to be:

- Paleochannel and river channel: garnet 60%: AMH 40%
- Floodplain: garnet 57%: AMH 35.5%
- Swale: garnet 53.25%: AMH 33%
- Dune: garnet 46%: AMH 30%

These figures have been used to estimate the recoverable reserves of garnet and AMH.

WATER

The wet separation plant at Aturga will require up to 1,000kL of water per day. There are no known aquifers in the immediate vicinity of the processing plant, however drilling is known to have identified a sizable aquifer approximately 16km to the east-northeast of the proposed plant site. Test drilling of this aquifer has not been completed, but in the opinion of Olympia's hydrological advisers it can sustain a yield in excess of 15L/sec (1,300kL/day) from a suitably constructed borefield.

The wastes returned to the pit will have a moisture content of between 1.5% and 3%. The rest of the water used in treatment will be recovered and reused.

FINANCIAL CONSIDERATIONS

HBH were commissioned by Olympia to undertake a feasibility study on the project. The study assumed 1.2Mt of sand per year would be mined and treated at Harts Range and Alice Springs. (The study concludes that the dry plant should be constructed in Alice Springs.) HBH concluded that the project is economically viable, with an acceptable return on capital invested, throughout an assumed 20 year mine life (Crawford *et al*, 2003).

MARKETING

Olympia has carried out extensive market research (Lockett, 2003). The garnet market has also been the subject of a recent review by Willis (2003). The reports identify that:

- 50,000t of garnet and 50,000t of slag are used in Australia at present
- Garnet does not have to be 100% pure to be successfully marketed
- Filtration grade garnet (>600µm) is in demand worldwide
- Water softening grade garnet (150-300µm) is in demand worldwide, particularly in Europe
- Garnetblende, in both the >600µm and 300-600µm size fractions, is a suitable replacement for the toxic slags currently in use for surface preparation blasting.

Olympia has recently prepared a number of market samples for dispatch to potential customers.

ENVIRONMENTAL FACTORS

An initial review of environmental management issues in the vicinity indicates that there are no likely impediments to mining. The proposed Aturga Mine is in an area where there are few trees and the owners of Mt Riddoch Station have achieved regeneration of the grass and scrublands during the past decade. The wastes returned to the pit will have a moisture content of between 1.5% and 3%. This moisture will ensure immediate seed sprout and plant regeneration from the replaced topsoil.

Olympia has engaged the services of a local environmental consultant who will advise on all environmental matters throughout the life of the mine.

GOVERNMENTAL ISSUES

Olympia has submitted a draft Notice of Intent to Mine to the Northern Territory Department of Business, Industry, Resources and Development. The NT Government have been supportive of the project and most aspects required for the development of the project have been settled.

RESERVE STATEMENT

Introduction

The estimated reserves of Garnet and AMH are summarized in Table 10. More detailed figures, from which the summary is derived, are in Tables 11 and 12. The original data and calculations are in Appendix 7.

Table 10 Reserve Statement Summary

| ORE TYPE | ORE (t) | GARNET in Sand (t) | GARNET Recovered (t) | AMH in Sand (t) | AMH Recovered (t) |
|--------------------------------|-------------------|--------------------------|----------------------------|-----------------------|-------------------------|
| PROVEN | | | | | |
| DUNE | 25,000,000 | 1,600,000 | 720,000 | 6,900,000 | 2,100,000 |
| FLOODPLAIN | 3,400,000 | 220,000 | 120,000 | 960,000 | 340,000 |
| PALEOCHANNEL | 6,000,000 | 390,000 | 230,000 | 1,400,000 | 570,000 |
| SWALE | 1,600,000 | 98,000 | 52,000 | 370,000 | 120,000 |
| TOTAL PROVEN | 36,000,000 | 2,300,000 | 1,100,000 | 9,600,000 | 3,100,000 |
| PROBABLE | | | | | |
| CREEK CHANNEL | 440,000 | 49,000 | 30,000 | 110,000 | 43,000 |
| FLOODPLAIN AND PALEOCHANNEL | 16,000,000 | 1,200,000 | 680,000 | 4,200,000 | 1,600,000 |
| DUNE | 18,000,000 | 1,000,000 | 480,000 | 4,800,000 | 1,400,000 |
| TOTAL PROBABLE | 35,000,000 | 2,300,000 | 1,200,000 | 9,100,000 | 3,100,000 |

Proven Reserve Methodology

The proven reserves were estimated for portions of the deposits that had been drilled on 200m spaced lines. The drill spacing along the lines varied from unit to unit. In general, it was:

- Dunes 0 and 1: 40m
- Dunes 9 and 10, swale, and underlying paleochannel: 60m
- Floodplain and underlying paleochannel: 20m

Reserves were estimated individually for grid north aligned blocks. The blocks were named alphabetically and were 400m long NS, and 250m wide (EW). Their distribution is shown on Figure 10. The estimation procedure was:

1. Each 400m long block contained two drill lines, for each of which cross-sections had been prepared. Ore zones were digitised onto each crosssection, with different **zones** being created for each different block and each ore type. An example is RES-ZONE ACFS, for which the letters AC designate the block, F designates that the ore type is floodplain, and S designates that the zone, or outline, was on the southern line drilled across the block.
2. Each zone was assigned to an **ore type** (dune, floodplain, paleochannel, or swale).
3. The database was interrogated to select all analysed samples from each zone. The averages of the values from all of these samples were then allocated as the grades for the

zone. The three values allocated were % heavy minerals in the sand fraction, % slimes, (<90µm), and % oversize (>1.7mm).

4. The % sand for each ore type in each zone was calculated (100 - % slimes and % oversize).
5. The cross-sectional area of each zone was calculated from the digitised data.
6. The average cross-sectional area of each ore type for each zone was calculated.
7. The volume of each ore type for each zone was calculated (400m x average cross-sectional area).
8. The tonnes of each ore type in each zone were calculated (S.G. of ore type x volume).
9. The tonnes of each ore type were adjusted for loss of top soil and of the wet plant area.
10. The tonnes of sand of each ore type for each zone were calculated (tonnes ore x % sand).
11. The tonnes of heavy mineral for each ore type for each zone were calculated (tonnes sand x % heavy mineral in sand).
12. A “% garnet in heavy minerals” was assigned to each ore type for each block (see page 23).
13. The tonnes of “garnet in sand” was calculated for each ore type for each block (tonnes of HM x % garnet in HM).
14. The tonnes of recoverable garnet were calculated for each ore type for each block, by applying the assumed recoveries for garnet from each ore type (see page 34).
15. The % of AMH in HM was calculated, by subtracting the assigned “garnet %” and the assigned “% other heavy minerals” from the % HM, for each ore type and block (see page 20).
16. The tonnes of “AMH in HM and in sand” were calculated for each ore type for each block (tonnes of HM x % AMH in HM).
17. The tonnes of recoverable AMH were calculated for each ore type for each block (tonnes of AMH in sand x 40%).

Proven Reserve Totals

The totals of the figures used in the derivation of the estimated proven reserves for each of the ore types are shown in Table 11.

Table 11 Proven Reserves

| ORE TYPE | ORE | SAND | OVERSIZE | SLIMES | HEAVY MINERAL |
|--------------|-------------------|-------------------|------------------|------------------|-------------------|
| | (t) | (t) | (t) | (t) | (t) |
| DUNE | 25,319,593 | 20,163,508 | 344,998 | 4,811,087 | 8,877,957 |
| FLOODPLAIN | 3,431,075 | 2,687,168 | 143,778 | 600,128 | 1,248,297 |
| PALEOCHANNEL | 6,033,270 | 4,332,096 | 850,591 | 819,444 | 1,913,981 |
| SWALE | 1,583,473 | 1,125,571 | 67,905 | 389,996 | 498,913 |
| TOTAL | 36,367,411 | 28,308,344 | 1,407,272 | 6,620,655 | 12,539,147 |

| ORE TYPE | GARNET in HM (%) | GARNET in Sand (t) | GARNET Recovered (t) | AMH in HM (%) | AMH in Sand (t) | AMH Recovered (t) |
|--------------|------------------|--------------------|----------------------|---------------|------------------|-------------------|
| DUNE | 17.6 | 1,565,353 | 720,062 | 77.2 | 6,855,389 | 2,056,617 |
| FLOODPLAIN | 16.9 | 215,268 | 120,248 | 77.3 | 964,933 | 342,551 |
| PALEOCHANNEL | 20.3 | 388,027 | 232,816 | 75.0 | 1,435,039 | 574,016 |
| SWALE | 19.6 | 97,787 | 52,072 | 73.5 | 366,701 | 121,011 |
| TOTAL | | 2,266,435 | 1,125,198 | | 9,644,667 | 3,094,195 |

Probable Reserve Methodology

The probable reserves were estimated for those portions of the Aturga Creek floodplain and channel and of Dunes 1 and 2 that had been drilled on broadly spaced lines (between 600m and 1200m apart). The drill spacing along the lines varied from unit to unit. In general, it was:

- Floodplain: 60m or 80m
- Channel: 10 to 30m
- Dune 1: 50m
- Dune 2: 40m

Reserves were estimated individually for irregular shaped units. The units were digitised from aerial photographs. Their distribution is shown on Figure 10. They were named as follows:

- Aturga Creek channel units: ARCA to ARCC
- Aturga Creek combined floodplain and paleochannel units: AFPA to AFPG
- Dune 1 (north of 745 7500N): D1-N
- Dune 2 (between 745 5100N and 745 7300N): D2-C

The estimation procedure was:

1. Digitise unit outline from rectified and gridded aerial photograph.
2. Calculate area of unit using Micromine.
3. Calculate average thickness of material within each unit.
4. Calculate volume of material within each unit (area x average thickness).

5. Calculate tonnes of material within each unit (volume x S.G. of ore type).
6. Calculate tonnes of ore within each unit by subtracting tonnes of top soil from the tonnes of material within each unit.
7. The database was interrogated to select all analysed samples from each unit. The averages of the values from all of these samples were then allocated as the grades for the unit. The three values allocated were % heavy minerals in the sand fraction, % slimes, (<90µm), and % oversize (>1.7mm).
8. The procedure outlined in steps 10 to 17, in the proven reserves methodology section above, was followed, culminating in the estimation of probable reserves of recoverable garnet and AMH for each unit.

Probable Reserve Totals

The totals of the figures used in the derivation of the estimated probable reserves for each of the ore types are shown in Tables 12.

Table 12 Probable Reserves

| ORE TYPE | ORE | SAND | OVERSIZE | SLIMES | HEAVY MINERAL |
|-----------------------------|-------------------|-------------------|------------------|------------------|-------------------|
| | (t) | (t) | (t) | (t) | (t) |
| CREEK CHANNEL | 440,160 | 348,384 | 57,483 | 34,294 | 165,097 |
| FLOODPLAIN AND PALEOCHANNEL | 16,101,230 | 12,581,304 | 1,029,604 | 2,491,322 | 5,681,415 |
| DUNE | 18,478,370 | 14,691,219 | 227,076 | 3,560,074 | 6,130,146 |
| TOTAL | 35,020,760 | 27,620,907 | 1,314,163 | 6,085,691 | 11,976,657 |

| ORE TYPE | GARNET in HM (%) | GARNET in Sand (t) | GARNET Recovered (t) | AMH in HM (%) | AMH in Sand (t) | AMH Recovered (t) |
|-----------------------------|------------------|--------------------|----------------------|---------------|------------------|-------------------|
| CREEK CHANNEL | 29.8 | 49,199 | 30,011 | 64.55 | 108,056 | 43,223 |
| FLOODPLAIN AND PALEOCHANNEL | 20.5 | 1,167,434 | 682,949 | 74.20 | 4,212,675 | 1,579,753 |
| DUNE | 16.9 | 1,038,975 | 477,928 | 77.95 | 4,775,553 | 1,432,666 |
| TOTAL | | 2,255,607 | 1,190,888 | | 9,096,284 | 3,055,641 |

Reserve-Resource Relationship

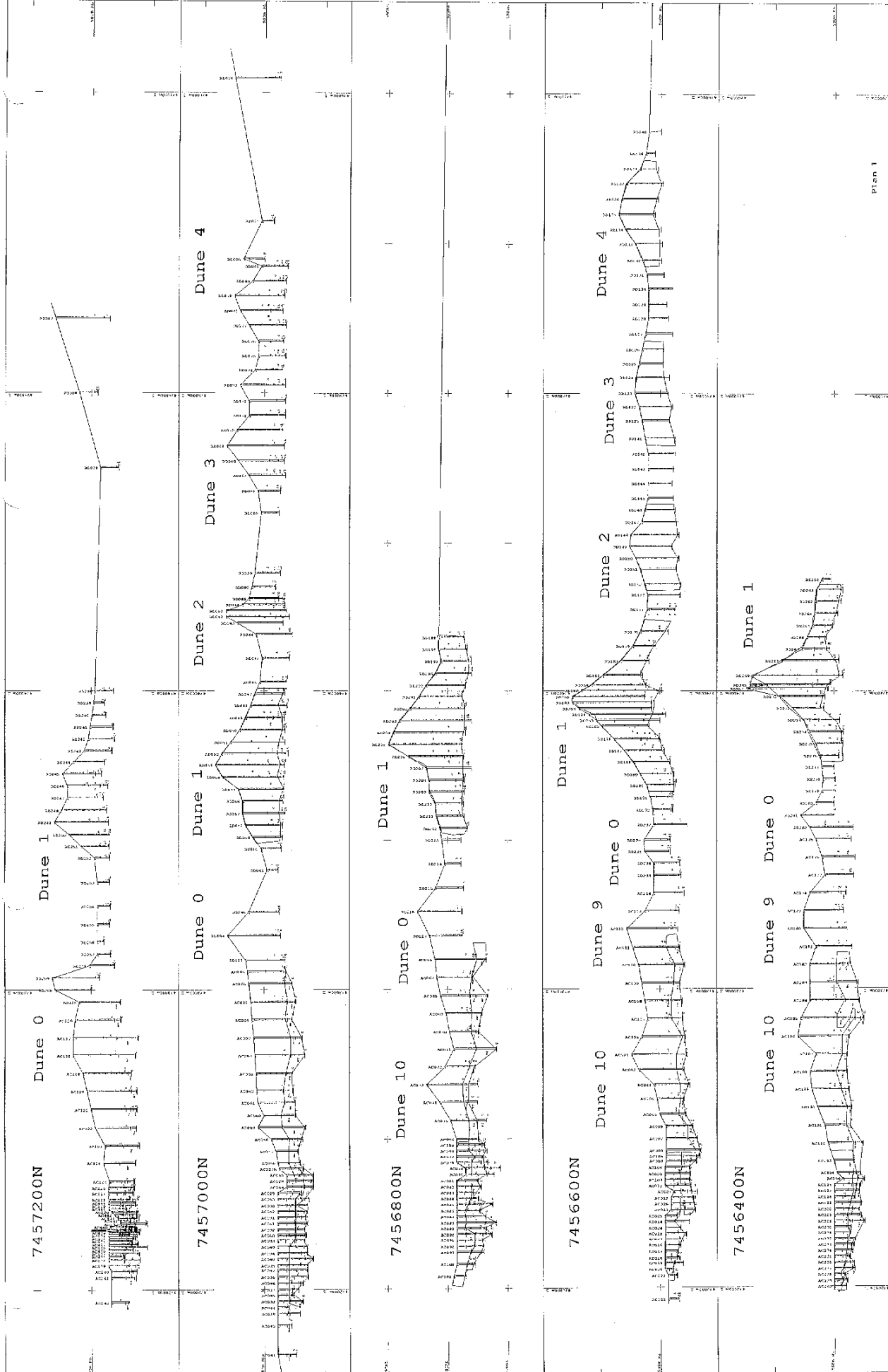
The estimated reserves replace the following resources detailed by Baxter and Doepel (2003):

- All measured resources
- All indicated resources except Dune 3
- A small proportion (18%) of the inferred resources of the Aturga floodplain
- The majority (67%) of the inferred resources of the Aturga Creek channel

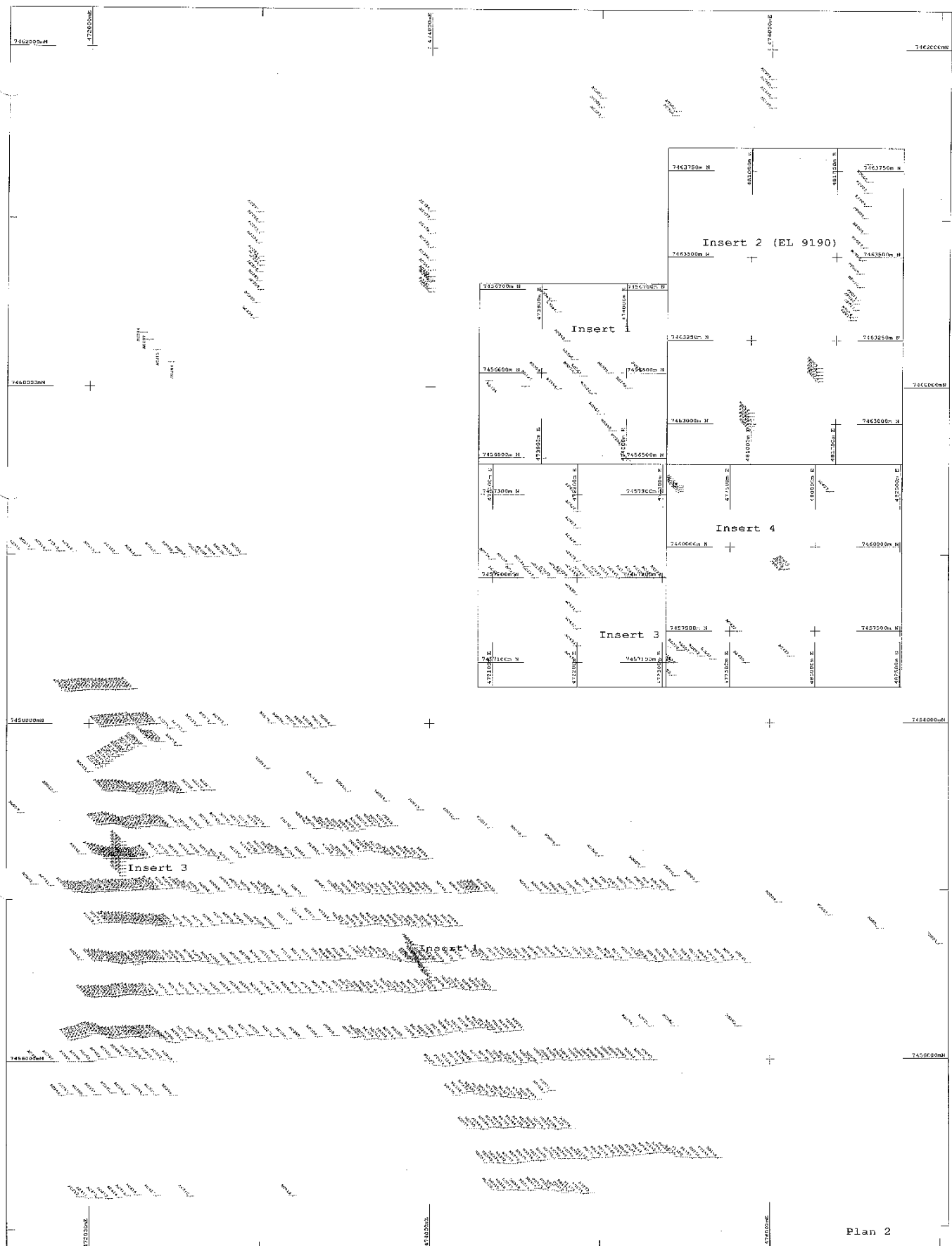
All other resources detailed in the resource report, including Dune 3, are additional to the reserves.

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| | | | | | | | | | | | |
|---|--|---|--|---|--|---|--|--|--|---|--|
| <p>7457200N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> | | <p>7456800N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> <p>Dune 5</p> <p>Dune 6</p> <p>Dune 7</p> <p>Dune 8</p> <p>Dune 9</p> <p>Dune 10</p> <p>Dune 11</p> | | <p>7456600N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> <p>Dune 5</p> <p>Dune 6</p> <p>Dune 7</p> <p>Dune 8</p> <p>Dune 9</p> <p>Dune 10</p> <p>Dune 11</p> | | <p>7456400N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> <p>Dune 5</p> <p>Dune 6</p> <p>Dune 7</p> <p>Dune 8</p> <p>Dune 9</p> <p>Dune 10</p> <p>Dune 11</p> | | <p>Drill Sections</p> <p>7457200N 7457000N 7456800N</p> <p>7456600N 7456400N</p> | | <p>Olympia Resources Ltd</p> <p>Harts Range</p> <p>Mount Rigdooch</p> <p>EL 10150</p> | |
| <p>7457200N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> | | <p>7456800N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> <p>Dune 5</p> <p>Dune 6</p> <p>Dune 7</p> <p>Dune 8</p> <p>Dune 9</p> <p>Dune 10</p> <p>Dune 11</p> | | <p>7456600N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> <p>Dune 5</p> <p>Dune 6</p> <p>Dune 7</p> <p>Dune 8</p> <p>Dune 9</p> <p>Dune 10</p> <p>Dune 11</p> | | <p>7456400N</p> <p>Dune 0</p> <p>Dune 1</p> <p>Dune 2</p> <p>Dune 3</p> <p>Dune 4</p> <p>Dune 5</p> <p>Dune 6</p> <p>Dune 7</p> <p>Dune 8</p> <p>Dune 9</p> <p>Dune 10</p> <p>Dune 11</p> | | <p>Drill Sections</p> <p>7457200N 7457000N 7456800N</p> <p>7456600N 7456400N</p> | | <p>Olympia Resources Ltd</p> <p>Harts Range</p> <p>Mount Rigdooch</p> <p>EL 10150</p> | |



Plan 2

| | | | | | | | | |
|-------------------------|--|---------|--|--|----------|------------------------|--|-----------------------|
| Plotted by | | Scale | | DATE | SHEET | Harts Range Project | | Olympia Resources Ltd |
| A Pty Ltd | | 1:10000 | | 27/08/03 | 1 of 1 | Harts Range | | Harts Range |
| Belmont WA, Australia | | | | REF No. | FILM | Drillhole Location Map | | Mount Riddoch |
| Tel +61 8 9478 3987 | | | | 0refno | 2002PLAN | | | EL 10150 |
| Fax +61 8 9478 3988 | | | |  | | | | |
| Email: crm@ilmetnet.au | | | | | | | | |
| Insert 1 Scale 1:2,000 | | | | | | | | |
| Insert 2 Scale 1:5,000 | | | | | | | | |
| Insert 3 Scale 1:2,000 | | | | | | | | |
| Insert 4 Scale 1:50,000 | | | | | | | | |



15.2. Notice of Intent



O L Y M P I A
RESOURCES LIMITED

OLYMPIA RESOURCES LIMITED

NOTICE OF INTENT TO MINE

HARTS RANGE GARNET PROJECT, NORTHERN TERRITORY

J Baxter
July 2003

Ref: SD/NOI/1008

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 - 3.2 Location**
 - 3.3 History**
4. Description of Proposal
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FIGURES

1. **Location Plan**
2. **Tenement Plan**

3. Cross section of Aturga floodplain
4. Cross section of dunes

1.0 SUMMARY

Olympia Resources Limited will extract sand-sized garnets from the fluvial and dune sediments on the floodplain of Aturga Creek either side of the Plenty Highway, under Mineral Lease 23868 (after grant) inclusive. The Mining Lease is entirely within EL10150. The operator of the mine is Olympia Resources Limited and the Project Manager is John Baxter.

Primary processing will occur in a wet plant built approximately 500 metres south of the Plenty Highway, concurrent with mining, and secondary processing at the Brewer Estate in Alice Springs. At Aturga Creek processing will be by screening, spirals and tables. Reject sands will go back into the excavations as backfill, fine (<180µm) heavy mineral concentrate will be stored as a concentrate. Topsoil will be removed prior to mining for respreading over rehabilitated sites.

The mining operation is expected to employ 16 – 20 employees for a period in excess of 25 years. It is expected the primary processing plant will be moved north of Plenty Highway after approximately 10 years. The proven and probable reserves, calculated independently by Continental Resource Management Pty Ltd are listed in Table 1 and Table 2.

Table 1 Proven Reserves at Aturga Creek

| UNIT | ORE (t) | SAND (t) | OVERSIZE (t) | SLIMES (t) | HM (t) | GARNET (t) | GARNET (t recovered) | AMH (t recovered) |
|--------------|-------------------|-------------------|------------------|------------------|-------------------|------------------|-------------------------|----------------------|
| DUNE | 26,000,000 | 21,000,000 | 350,000 | 4,900,000 | 9,000,000 | 1,600,000 | 870,000 | 3,150,0 |
| FLOODPLAIN | 3,500,000 | 2,700,000 | 150,000 | 610,000 | 1,300,000 | 220,000 | 130,000 | 455,0 |
| PALEOCHANNEL | 6,000,000 | 4,400,000 | 860,000 | 820,000 | 1,900,000 | 390,000 | 240,000 | 665,0 |
| SWALE | 1,600,000 | 1,100,000 | 69,000 | 400,000 | 510,000 | 99,000 | 55,000 | 178,5 |
| TOTAL | 37,000,000 | 29,000,000 | 1,400,000 | 6,700,000 | 13,000,000 | 2,300,000 | 1,300,000 | 4,448,5 |

Table 2 Probable Reserves at Aturga Creek

| | ORE (t) | OVERSIZE (t) | SLIME (t) | HM % | SAND (t) | GARNET (t) | GARNET recovered (t) | AMH recovered |
|----------------------------|-------------------|------------------|------------------|---------|-------------------|------------------|-------------------------|------------------|
| Aturga Creek Channel | 441,000 | 57,000 | 34,000 | 47.4 | 350,000 | 49,000 | 30,000 | 154 |
| Floodplain & Palaeochannel | 16,300,000 | 1,050,000 | 2,500,000 | 45.2 | 12,750,000 | 1,200,000 | 710,000 | 5,705 |
| Dunes | 6,351,000 | 51,000 | 1,100,000 | 40.5 | 5,200,000 | 390,000 | 220,000 | 1,560 |
| TOTAL | 23,092,000 | 1,158,000 | 3,634,000 | | 18,300,000 | 1,639,000 | 960,000 | 7,419 |

The land is under pastoral lease PPL 989 (Mt Riddock Station). The owner Harts Range Pty Ltd (Dick Cadzow) has been notified.

The mining operations may involve the removal of some trees along the mine path. Trees with sufficient surrounding buffer area will be retained where in major stands. The reject sands that go back into the sand pit as backfill of the excavations, will be contoured as a parallel process, as the mining operation moves along the creek, and top soil, seed and mulch will be spread on the surface as directed by consultant ecologists.

2.0 DETAILS OF APPLICANT

Primary Place of Business:

**Olympia Resources Limited
Resources Limited
Suite 29, Level 4, 25 Walters Drive
Street
HERDSMAN WA 6016
6151
(08 9244 1411)**

Registered Office:

**Olympia
Level 1, 9 Bowman
SOUTH PERTH WA**

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3.0 TENEMENTS: LOCATION AND HISTORY

3.1 MINE NAME:

Aturga

3.2 LOCATION:

Adjacent to Plenty Highway, approximately 170 kilometres northeast of Alice Springs via the Stuart and Plenty Highway (Figure 1).

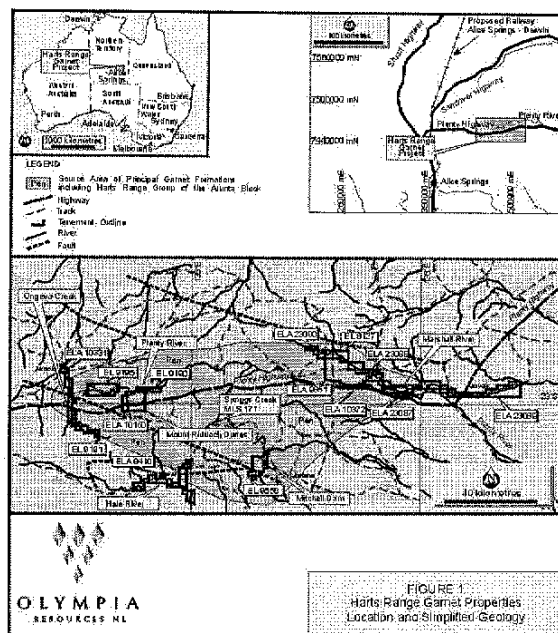


Figure 1 Location Map

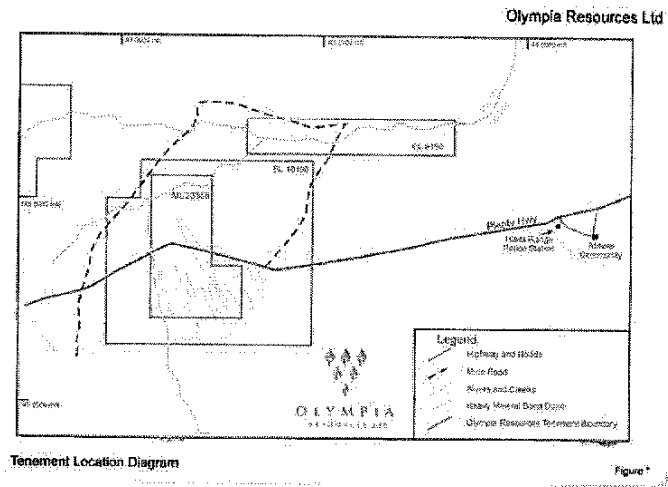


Figure 2 Tenement Location Plan

3.3 HISTORY:

Garnet sands have been identified in creek beds in the Harts Range since the 1960s. The mineralisation along the banks of Aturga Creek was discovered by Olympia Resources Ltd while exploring E10150. The lease area has been used for rangeland pastoral production for 90 years and has not previously been mined.

4.0 DESCRIPTION OF PROPOSAL

4.1 SITE LAYOUT:

Olympia Resources Limited Aturga Mine consists of one lease that contains the Plenty Highway and the floodplain of Aturga Creek (Figure 1). Garnet and aluminio-magnesio-hornblende (AMH) will be extracted from the palaeochannel and floodplain sediments. Haul roads will be constructed between the pit and plant and between the plant and the Plenty Highway. Existing roads between the Mining Lease and Alice Springs will be used.

4.2 EXTRACTION AND PRIMARY PROCESSING:

The deposits along the floodplain of the Aturga Creek have a fairly stable stratigraphy. A typical cross-section is presented as Figure .

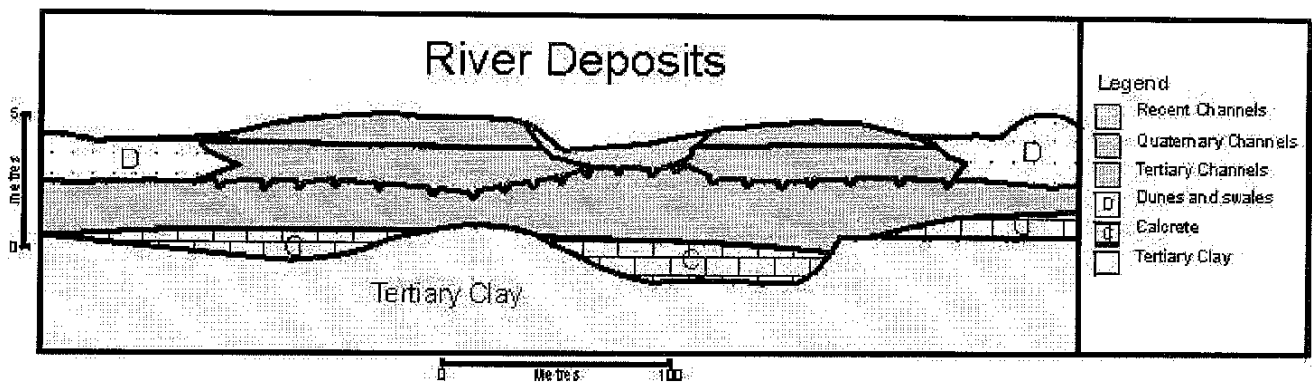


Figure 3 Cross Section of Aturga Floodplain

Adjacent dunes contain heavy mineral (garnet and AMH) and will be mined during the operation. A typical cross-section of the dunes is shown in Figure .

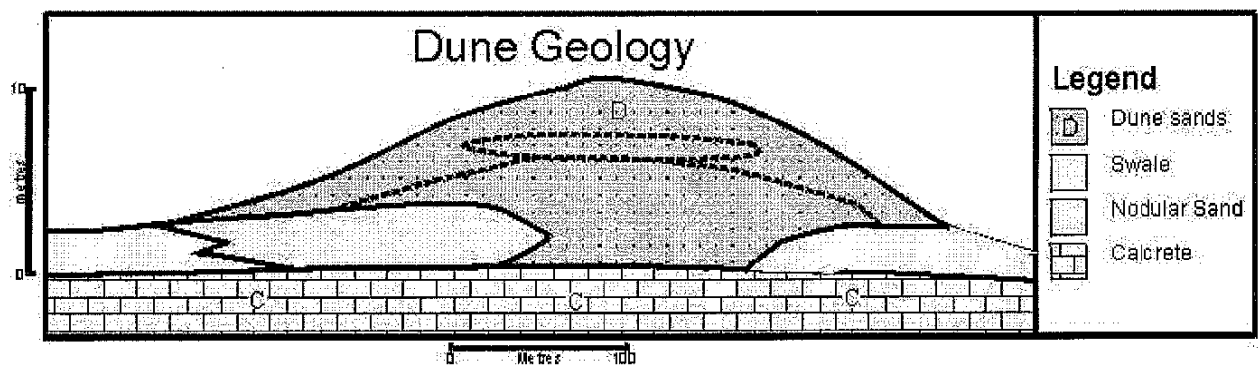


Figure 4 Cross Section of Dunes

All topsoil will be removed, stockpiled and returned to the surface of the pit during rehabilitation. Both the floodplain and dune deposits have a calcrete

lithified base above Tertiary green clay. The sandpit will be extracting all units above the calcrete (approximately 5m deep). It will be carted to the plant by dump trucks. The sand will be stored on a run of mine stockpile adjacent to the plant. Mixing of various sands will occur prior to processing through the wet plant screening oversize ($>2\text{mm}$) and undersize ($<180\mu\text{m}$) for return to the pit. The remainder will pass through spirals, jigs and tables to produce fine ($180\text{--}250\mu\text{m}$) and coarse ($>250\mu\text{m}$) concentrate (garnet and AMH) and quartz sand. The quartz sand will be returned to the pit as backfill.

The heavy mineral concentrate will then be either:

- stored near the plant for further processing if $< 250\mu\text{m}$, or
- trucked to the dry separation plant at Brewer Estate in Alice Springs if $>250\mu\text{m}$ as follows:
 - $>710\mu\text{m}$ garnet concentrate
 - $> 420\mu\text{m}$ garnet concentrate
 - $250\text{--}710\mu\text{m}$ AMH concentrate.

4.3 SECONDARY PROCESSING AND PACKAGING:

Heavy mineral concentrate will be dried and passed over magnetic, electrostatic and high-tension separators to remove the small amount of remaining quartz sand. The quartz will be stockpiled at the plant for sale as fill in Alice Springs. Ilmenite may also be recovered at this stage.

The $>710\mu\text{m}$ and $420\text{--}710\mu\text{m}$ garnet sand final product will then be packaged into 1.2 tonne bulka bags or 25kg paper bags for distribution into the Australian domestic market and/or railed to Darwin for export. The $250\text{--}710\mu\text{m}$ AMH final product will be transferred to bulk containers, or rail cars and shipped to Darwin Port for export.

4.4 TRANSPORT:

The bulk concentrates will be taken from Aturga Wet Plant Site to the Brewer Estate in 120t triple road trains. It is expected that initially this will involve 5–6 return trips per day passing along Plenty Highway and Stuart Highway.

The final garnet and AMH products will be transported from Alice Springs to markets:

- In the southern Australia states and New Zealand by rail to Adelaide or Port Augusta
- In northern Australia, Southeast Asia and Europe by rail to the Port of Darwin

The bulk and/or containerized AMH and garnet (garnetblende) will be transported to Darwin on several occasions per week.

4.5 RESERVES AND EXPECTED MINE LIFE:

The initial mining lease has been estimated to contain approximately 6 million tonnes of garnet and AMH in economic concentrations (2 to +5 metres).

Heavy mineral grades between 35 and 40% are common through the deposit. The majority of the heavy mineral fraction (~80%) is AMH, garnet is about 18% and ilmenite, magnetite, etc the remainder. In the reserve calculation it has been assumed that the < 250µm is not economic at present. Recovery and dilution discounts have been applied to grade calculations and further discounts have been applied for conservatism.

It is anticipated that 1,250,000 tonnes of sand will be processed per year, about 1,000,000 tonnes will be returned to the rehabilitated areas. The lease will have operating life of at least 25 years.

4.6 WORKFORCE:

A staff of 9 – 15 people will reside at the processing site on a roster basis. Mining along the floodplain of Aturga Creek will operate on a 24 hour day in three shifts. Some staff may be brought to site daily from the Harts Range community.

The Operations Manager will reside in Alice Springs; a plant supervisor will be on site at the Aturga Minesite and a supervising geologist and consultant ecologist will visit as necessary. The Operations Manager will handle general administration, but pays, accounts and correspondence with the N T Department of Business, Industry and Resource Development (DBIRD) will be dealt with at the Head Office of Olympia Resources Limited in Perth Western Australia.

The staff will be housed in 2 person ATCO style accommodation, self-contained with kitchen and it is envisaged that each block will contain ablution facilities. A recreation hall/wet mess and above ground relocatable swimming pool is proposed for the camp. Is there a kitchen or will staff do their own cooking?

In the model where the dry plant is at the Brewer Estate it is estimated that up to 5 people will be employed on site.

4.7 WASTE MANAGEMENT:

Mining waste will consist of reject sands, which will be used as backfill in the excavated area, wherever the current mining site is at the time. The scalping screens, magnetic and electrostatic separators do not use water or chemical based treatment, so no waste is expected from their operation.

Sewerage from the plant and accommodation sites will be treated in buried septic tanks. Other garbage, including office waste, kitchen scraps and so on, will be buried in a garbage pit located no less than 200 metres from the accommodation. Kitchen scraps will be burned in a fenced enclosure to prevent scavenging by wildlife.

A small amount of hydrocarbon waste (oil, oily rags, bearing grease and solvent) is expected from the workshop area due to the normal maintenance of vehicles and machines. This waste will also be buried in the

garbage pit or disposed to a licensed waste disposal company in Alice Springs as directed by DBIRD.

4.8 WATER MANAGEMENT:

Water will be piped from a bore field northeast of the Harts Range Community and stored in fibreglass or PVC tanks for the use in the plant and the accommodation sites. It is anticipated that about 1,000 tonnes per day will be needed. Waste water will be treated in septic tanks and leach drains.

4.9 REHABILITATION:

The sand pits will be mined to the horizon where the palaeochannel meets the calcreted green clay or basement. Before mining, top soil to a depth of about 10cm will be stripped and stored in shallow mounds till re-spread or spread immediately over backfilled areas. Trees in swales will be preserved, as will major stands of mature trees within the floodplain including some isolated mature trees, particularly those designated as significant trees by Aboriginal Traditional Owners (TOs).

After mining, the excavation site will be backfilled with reject alluvial sands. This will be a concurrent process with priority being given to those sites that are upstream of any trees to be preserved.

Excavation sites will be backfilled to approximately their pre-mining levels. Top soil recovered from the concurrently mined area or stored mounds will be spread over the backfill to an appropriate depth of 5 to 10 cm. Available organic material and seed collected from local plants or supplied by the local Aboriginal community from local areas will be spread over the surface of the mined out section or as advised by consultant Ecologists/Horticulturists.

Access to Aturga mine will be established using graded roads. (Will road use be suspended when it rains and the road is too wet to drive on? If so, what happens to accumulating ore?) When the access is no longer required, rehabilitation will be performed according to the consultant's advice.

5.0 TIMING OF DEVELOPMENT

Site development and hiring of staff is planned to begin early in 2004 after granting of the mining lease and subject to availability of equipment.

6.0 LAND USE

The floodplain, dunes and adjacent land are part of the Mt Riddock Pastoral Lease, currently held by Harts Range Pty Ltd. Under this lease, the land is used for rangeland cattle production.

The Eastern Arrernte people have one area of significance on the eastern side of the mining lease in the region; the relevant areas of exclusion are outlined in an AAPA Certificate.

6.1 POST MINING:

Long-term change to the landscape will be minimal as a result of mining with re-worked alluvial soils being backfilled and surface soils being returned to the surface where vegetation growth will continue. Land uses that occurred previous to mining may continue after appropriate protection from grazing to allow rehabilitation and the close of operations.

7.0 EXISTING ENVIRONMENT

7.1 CLIMATE:

Harts Range is in the arid inland. The climate pattern is characterised by an extremely high moisture deficit, and a wide temperature range, both diurnally and seasonally.

Average Temperatures: January maximum 37.9, minimum 21.9, with at least one day a week likely to exceed 42.1 degrees Centigrade. July maximum 21.5, minimum 4.6, with at least one night a week likely to go below zero degrees Centigrade.

Rainfall occurs irregularly, more often in the summer but also in the winter. The median annual rainfall is 200mm, the 10 percentile is 100mm and the 90 percentile is 400mm. Rain commonly falls as more or less isolated storms, resulting in sporadic and unpredictable creek flow patterns. Tropical cyclonic and winter depressions may result in prolonged wet periods which are irregular and may be related to El Nino periodicity.

Average annual evaporation is 3400mm. Humidity in January averages 30% at 9.00am dropping to 15% at 3.00pm. In July, the 9.00am humidity is 60%, and 30% at 3.00pm.

The wind in the southern NT is generally from the ESE at around 10 – 20 kilometres. However, wind strength and direction is extremely variable according to time of day and the local geography.

Data are taken from the closest recording station, at Jervois (125 kilometres east of the Harts Range, on the Plenty Highway). Wind data come from the Alice Springs records. Data are obtained from the Bureau of Meteorology and from the Climatic Atlas of Australia.

7.2 TOPOGRAPHY AND DRAINAGE:

The Mining Lease is situated in the floodplain of the Plenty River along the northern edge of the Harts Ranges. The Harts Ranges show rugged topography, with steep rocky hills and mountains.

The Plenty floodplain forms over a Tertiary basin and is relatively flat, with little outcrop and is classed as Kanandra Land System (Perry et al 1962). Aturga Creek and the Plenty River have sandy channels 1-5m deep classed as Sandover Land System (Perry et al, 1962) set in floodplains. There are minor outcrops of basement gneiss in the Plenty River.

In the creek channels, flow is typically a quick rise in water level to a flood

peak after heavy rain, followed by several days or weeks of declining flows. Flash-flooding is relatively common. Floodplain inundation for periods longer than 1 week is uncommon. Flow records for the Plenty River, at a station of 25 kilometres northeast of the Harts Range Racecourse, indicate that the river averages two or three small flows per year; flow duration is around 1 – 5 days. Large flows may last for up to three weeks. Aturga Creek, with a smaller catchment, flows much more infrequently (average one small flow every two years). Creeks with smaller catchments, or in local rain shadows, may flow as little as once or twice a decade.

7.3 SOILS:

The floodplain is composed of gravel, sand and silt. Dunes are made up of silt and sand. Mature surface soils form a sandy loam. Calcrete occurs in local depressions.

7.4 FLORA AND FAUNA:

The Plenty River channel and banks are dominated by river red-gums (*Corymbia* (formerly *Eucalyptus*) *camaldulensis*), with bloodwoods (*Corymbia opaca*), hakeas, and melaleucas occurring sparsely along Aturga creek. Ground cover consists of annual and perennial grasses and forbs. The higher ground away from the creeks is dominated by grasses and forbs, with sparse cover of ironwoods (*Acacia estrophiolata*), Whitewoods (*Atalaya hemiglauca*) and occasional woody shrubs (*Eremophilas*, *Sennas*). No detailed flora studies have been conducted in the region of the mine although a general survey of the Station was conducted in 1985 by Low and Strong. Their survey found several species known to be uncommon or of restricted distribution, but no species on the alluvial plains are listed as nationally vulnerable.

No declared noxious weeds are known in the area, although Parkinsonia and Castor Oil Plant are known on the station and will be guarded against. A large number of plant species have been introduced for pasture improvement or accidentally on the pastoral lease. The sandy loams of the mineral lease area are not well suited for most of these introduced species.

No detailed fauna survey has been conducted in the area of the proposed mine site. Low and Strong in their survey of the pastoral lease in 1985 found that a population of Brush-tailed Possums (*Trichosurus vulpecular*) that had occurred on the Plenty River in 1981 had disappeared, probably as a result of fox predation and hunting by TOs. The Biological Records held at the Parks and Wildlife Commission of the Northern Territory has shown that two bats, the little cave eptisicus (*Eptesicus pumilus*) and Hill's sheathtail bat (*Taphozous hilli*) have been seen in the area.

The Mud Tank Zircon Field is in the hills south of the mine area, and has had a more detailed faunal survey carried out upon it. In addition, the Biological Records for the area were scanned. Below is a list of the mammals and reptiles found in the Mud Tank areathat may be expected in the vicinity of the proposed mine site.

Mammals:

| | |
|------------------------------|--------------------------------|
| Antechinomys laniger | Marsupial hopping mouse |
| Canis familiaris | Dingo |
| Oryctolagus cuniculus | Feral rabbit |
| Macropus rufus | Red kangaroo |
| Mus musculus | Mouse |
| Sminthopsis macroura | Stripe-faced dunnart |
| Trichosurus vulpecula | Common brushtail possum |

Reptiles:

Ctenophorus nuchalis, Diplodactylus ciliaris, Gehyra variegata, Heteronotia binoei, Rhynchoedura ornata, Tympanocryptis cephalus, Varanus gouldii.

Of these species, only the Possum is known to be rare, and it is likely to be extinct in the area. The mineral lease would not have regional impact on any of the species.

Reference: Low, W.A. and Strong, B.W., 1985 Resource Appraisal of Mt. Riddock Pastoral lease for Conservation Commission of NT (now Parks and Wildlife Commission).

Perry, R.A. et al. 1962 Land Sytems of the Alice Springs region. CSIRO, Melbourne.

8.0 POTENTIAL IMPACTS

There will be very little impact on active channels where gum trees are well developed. Removal of some trees from the floodplain will occur during excavation, but significant groups of trees and trees within the dune swales will have an appropriate buffer area left around them and not be damaged. This will ensure there are tree corridors through the mine area.

The mining operation will remove the ground storey vegetation from Aturga Creek, but the retained topsoil will contain seeds and be reinstated immediately on backfilled areas to allow for revegetation when appropriate rains fall.

A permanent mine camp area will be established on Mining Lease 23868. Grasses and shrubs will be cleared for buildings, walkways, roads and parking areas. Top soil will be removed from permanent building, road and parking areas and stored in shallow mounds for replacement when the mining operation is complete. Disposal of kitchen waste by burning in an enclosed area will prevent the concentration of scavengers which might opportunistically prey on native fauna in the region.

9.0 PROPOSED ENVIRONMENTAL MANAGEMENT

Rehabilitation will be integrated into the mine plan and will be conducted as part of the mining operation. Rehabilitation through respreading of the topsoil immediately onto the backfill will result in the vegetation diversity being maintained and will preserve the integrity of the floodplain and dunes. A consultant ecologist will advise on the whole environmental

management and rehabilitation process and review the operation at appropriate stages.

Vegetation will be allowed to regrow naturally after mining, from top soil and possibly by seed collected from local plants and spread over the surface or as directed by consultative advice.

After the close of operations, the mine site will be cleared of equipment and buildings and the site (including roads) will be shallow ripped to break up compacted areas and stored top soil respread . Re-growth will be encouraged by fencing out livestock for an appropriate period to allow regeneration and no vegetation will be planted that is not native to the area or has the potential to become a problem weed.



OLYMPIA
RESOURCES LIMITED

15.3. Groundwater Assessment Report

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Territory Groundwater Services
27/288 Casuarina Drive
Nightcliff NT 0810
26th August 2003

John Baxter
Olympia Resources NL
Level 1
9 Bowman Street
South Perth WA 61511

Dear John,

In response to our recent discussions, please note the following regarding groundwater availability and prospects in the Titjikala Basin, Harts Range.

The Titjikala Basin is a relatively small Tertiary basin dominated by clays and sandy clays with porous sandy lithologies in some locations. At least three stock bores penetrate the sequence and have been in production for many years. The airlift yield for the bores was between 1 – 3 L/s, although test pumping would probably show that higher yields are possible from these bores. Water quality throughout the basin varies from 500 – 2000 mg/L.

Four community production bores were drilled into the basin at Titjikala in June 2000. Airlift yields to 10 L/s were struck in sandy horizons at depths between 60 m and 90 m. The long term recommended yield for the bores varied from 2 – 5 L/s although one bore was tested at rates up to 8 L/s. Some difficulties with hole collapse during construction were encountered and minor production of very fine grained sand continued throughout the test pump in one bore. The yield and lithology varied over short distances which is typical of Tertiary basins in central Australia.

About 20 bores were drilling into the basin by Alcoa of Australia (1980) in search of uranium deposits. Although no water yields were noted in the report, a number of the holes contained stratigraphic sequences very similar to that penetrated during the Titjikala drilling program.

The drilling and testing at Titjikala community shows that minor problems may occur during drilling and construction. As such, it may be necessary to use non-standard drilling techniques to complete bore construction and wedge wire stainless steel screens to reduce sediment

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production. This may have a small influence on the cost to complete bore construction but will not influence the expected bore yields.

The above shows that groundwater prospects within the Titjikala basin are very good. It is highly likely that production bores with long term continuous yields of between 3 L/s and 5 L/s can be constructed. An east west trending line of up to 5 production bores may be necessary to supply the required yield with an adequate safety margin. Bore depths will range up to 90 m and the water quality will likely be between 500 mg/L and 2000 mg/L. The borefield is likely to be about 13 km east of the plant.

Combining the above drilling data with high resolution aeromagnetic data (available only for the Alcoota 1:250 000 map sheet) points to a minimum basin area of at least 100 km². The eastern extent of the basin is not known at present due to lack of drilling and aeromagnetic data. It should be possible to calculate the stored volume of the basin after the main production bore drilling and testing program. From the stored volumes and anticipated recharge rates, a nominal sustainable yield should be able to be calculated.

No impact on the Titjikala community water supply is expected with a borefield yield of less than 12 L/s. The borefield will be located at least 3 km downgradient of the community bores. A monitoring bore placed midway between the two borefields would allow quantitative data to be collected to determine any impact on the community borefield.

For and on behalf of
TERRITORY GROUNDWATER SERVICES



I Matthews
(Hydrogeologist and Manager)