FINAL REPORT

DEALING WITH LAND NOT THE SUBJECT OF CONTINUING TENURE

EL 8423

"PLENTY RIVER"

HARTS RANGE REGION, N.T.
HUCKITTA [SF 53-11] 1:250,000

TO N.T. D.M.E
FOR PERIOD TO JULY 1997

LICENCE HOLDER:

CHAMBIGNE GARNET PTY LTD

REPORT COMPILED BY:

CHAMBIGNE GARNET

15-4-98 REPLACING THE REPORT OF 16-1-98

CR98/8951

TABLE OF CONTENTS

APPENDICES

1 SUMMARY

Up until this reporting period Chambigne reported on its almost contiguous three Els (8076, 8384 & 8423), all of which located on the Plenty River, in one report. During this reporting period Chambigne applied for three mineral leases, one from within EL8076, one encompassing the entire river system within EL8384 and the third encompassing the entire river system within EL8423. Subsequent to the mineral lease applications, the areas applied for in the ELs were surrendered and in the case of EL8384 & EL8423, this necessitates annual and final reports, therefore this report addresses the final report for EL8423, over areas not the subject of continuing tenure.

The EL embodied in this report lies along the eastward-flowing Plenty River, just to the north of the Strangways and Harts Ranges, and is focused on alluvial garnet and to a lesser extent, other industrial minerals in the sands of the riverbed only.

The areas of the EL not the subject of continuing tenure was systematically traversed in an endeavour to locate feeder creeks, of sufficient and potential tonnage, not identified on geological or topographical maps however none was found. Subsequently no sampling was undertaken from areas not forming part of the Plenty River.

GARNET PRODUCT

Chambigne's principal end-product is a natural garnet sand comprising about 98% almandine rich garnet in a range of size fractions from 45μ to 5mm. This mineral concentrate is currently used as an abrasive in a large variety of form factors; it is also used as an inert substance in chemical processes and filtration. Applications for granular garnet are increasing and it is supplanting previously used materials such as silica sand, which in many abrasive applications poses health risks.

The major element chemical composition of a typical Chambigne garnet test concentrate, determined by Analabs (Perth) using x-ray fluorescence is as follows:

SiO_2	38.99%	**MnO**	0.69%
Al_2O_3	22.19%	**MgO**	10.19%
FeO^T	26.80%	**CaO**	1.10%

This analysis corresponds to the following mineralogical percentage garnet end-members:

Almandine $_{56.2}$ Pyrope $_{38.8}$ Grossular $_{3.0}$ Spessartine $_{1.5}$ Andradite $_{0.5}$

These major components are the common rock and soil forming elements, and chemically, none of these pose any health risk in silica form. The total trace element contents of the above size fractions has been determined by Analabs (Perth) using ICPMS-total dissolution. The units below are all in ppm, and the adjacent standards are for abrasives set by the Department of Workplace Health and Safety (Qld) and the USA Federal Government Military Specification.

ELEMENT	RESULT	STANDARD DOWHS	STANDARD USMIL
Antimony	<4	1,000	500
Arsenic	17	1,000	500
Barium	20		10,000
Beryllium	<1	1,000	75
Cadmium	<5	1,000	100
Chromium	110	5,000	2,500
Cobalt	28	5,000	8,000
Copper	14		2,500
Lead	<5	1,000	1,000
Mercury	<10		20
Molybdenum	8		3,500
Nickel	20	5,000	2,000
Selenium	50		100
Silver	<0.1		500
Thallium	<0.5		700
Thorium			
Uranium			
Vanadium	79		2,400
Zinc	5		5,000

With the trace elements above, the lower the values, the better the product. The samples analysed all have elemental values significantly below the upper limits set by the standards, and Chambigne's product is quite superior in this regard. Additionally independent chemical tests for trace elements in similar Chambigne product serve only to reinforce the above values. It must be noted that these trace element values vary from deposit to deposit, but for geochemical and mineralogical reasons, are not expected to approach the set upper limits. Constant testing, as part of QA, should ensure that no product will fall outside the most stringent guideline, though the above data indicate that this should never arise.

The garnet concentrate is remarkably fresh, and the garnet is quite stable in water - it is insoluble. Two size fractions were subjected to sonic extraction (in accordance with USEPA 3550) by Analabs (Brisbane) for 1:5 sample:water leaching. The analyses of the resultant waters or leachates are as follows:

Analyte	**-600µ to +250µ**	**-250µ**
pH	7.0	7.1
Cadmium	<0.005 ppm	<0.005 ppm
Selenium	<0.005 ppm	<0.005 ppm
Sulphate	<0.5 ppm	<0.5 ppm
Chloride	<0.5 ppm	<0.5 ppm

The pH of the leachates is neutral, and the potentially dissolved toxic element concentrations are below the analytical detection limits (the USAMIL upper limit is 1 ppm for both Cd and Se); chloride and sulphate values are insignificant. Additional leaching tests carried out by SIMTARS for most of the elements listed in the trace element table indicate values generally below the detection limits; there are no concerns with any of the elements exceeding any specification for abrasives.

The mineral habit of granular garnet, and its surface interactions with human tissues, appear to have no deleterious interactions such as silicosis or asbestosis. No significant quantities of any dust should be inhaled, but the relative density of garnet (~4 g/cm^3), compared to that of quartz (2.65 g/cm^3), should lead to a lower dispersal of garnet dust. The volume of free quartz in the concentrates (as inseparable microinclusions within the garnet grains) is substantially less than 1%, and meets the DOWHS, USAMIL and ISO standards.

Garnet concentrates derived from beach sands can contain significant amounts of thorium and uranium, principally in the mineral monazite. These elements emit low levels of radiation, and long-term exposure to significant concentrations may pose a health hazard. Chambigne's garnet concentrates are not derived from beach sand, and are quite low in these elements, becoming consequential only in those superfine fractions which will be

returned with the rejects, or sold as monazite concentrate, and not a garnet product. By way of comparison, typical Th and U concentrations in crustal rocks and granite dimension stones are 5 to 50 ppm and 1.5 to 6 ppm respectively. Chambigne's garnet products fall well within or below these natural values. As an additional check, a common Chambigne garnet fraction was tested for radiation at the Queensland University of Technology, and returned a net radiation value of 6.2/s/kg, well under those of most commercial garnet products.

The only significant mechanical property of garnet worth noting here is the hardness. The individual Knoop hardness across the size range of Chambigne's garnet products fall in the range 1500 to 2100 kg/mm^2, with an average of 1835 kg/mm^2, for 137 successful measurements. Other independent testing yields similar results, indicating that this garnet's hardness is the highest of known commercially available garnet products.

The garnet is a remarkably fresh and clean almandine-dominated solid solution, with small amounts of inseparable quartz and biotite microinclusions. Chambigne's garnet concentrates easily meet or significantly exceed every industrial, environmental and safety criterion currently set for commercial garnet sand products and the test products were demonstrably superior to all current commercial garnet sand products, domestic and international.

2 INTRODUCTION AND TENURE

The exploration licence, EL8423 comprising 40 graticular blocks of approximately 129km^2, was granted to Chambigne Resources Pty Ltd on the 20th of December, 1993.

No blocks with EL8423 were relinquished during its tenure however a deferral of reduction was approved. On the 18-10-94, permission was sought from the N.T. Department of Mines and Energy to submit joint reports for the three Els (8076, 8384 & 8423), as all share a similar geological framework, and all were taken up principally to

explore for and exploit the garnetiferous sands of the Plenty River and its feeders; this was subsequently granted.

3 LOCATION AND ACCESS

EL8423 is centred on the eastwards flowing Plenty River, with the precise location of the EL shown on the tenement location map as **Appendix page 1.**

Access to the EL is via the Plenty Highway, which runs east from the Stuart Highway, roughly subparallel to the Plenty River, on its southern side. Numerous station roads and tracks run off the Plenty Highway, crossing the Plenty River, and in most places, rough and rarely used but quite navigable tracks run along parts of the banks of the River.

4 GEOLOGY OF EL8423

Chambigne's garnet resources are all geologically young detrital or alluvial deposits in creeks and river beds, located in the Arunta Block, some 200km ENE of Alice Springs. The source rocks for all these deposits comprise a specific sequence of Proterozoic garnetiferous pelitic gneisses and amphibolites, such that the bulk test samples evaluated can be reasonably expected to reflect the mechanical and chemical properties of future commercial product. There are other garnetiferous units throughout the eastern Arunta Block, but these yield mainly grossular-andradite garnets, whose mechanical and chemical properties may be different and less desirable than the almandine-dominated garnets in Chambigne's Els and MLs.

The EL lies in the flood plain of the Plenty River, with little in the way of massive outcrops; numerous smaller outcrops and rock bars, however, indicate that for the most part, the riverbed lies in the mid-Proterozoic metamorphic rocks of the Harts Range Group. To the west, some of the shallow feeders cut through deeply weathered and

essentially undifferentiated Lower Triassic rocks, but these have no real significance in terms of the garnet genesis or resource volume.

Of the Harts Range Group rocks, the most significant are the Irindina Gneiss, and the Riddock Amphibolite; both are heterogeneous, and may carry from zero to 18 volume% garnet, though the average for the Gneiss is closer to 10%. From a consideration of the regional geology, petrology and topography, it is evident that the sources of most of the garnet in the river sands are the two rock units named previously. There appears to be little if any contribution to the river sands of grossular-andradite garnet from the rare calc-silicate rocks that are garnetiferous, or of almandine-rich garnets from the weakly garnetiferous lower grade schists to the north of the Plenty.

The geological-lithological distribution of rocks adjacent to the ELs can be seen on the Alice Springs, Alcoota, Illogwa Creek and Huckitta 1:250,000 Geological maps. For a better appreciation of the distribution of petrological types, refer to the Geology of the Strangways Range Region, the Arltunga-Harts Range Special, and the Quartz 1:100,000 geological maps.

It is of particular note, in relation to garnet grades, that there is little direct creek or river-fed input into the Plenty River from the north, except from a feeder creek of the Marshall River which empties into the Plenty River at approx. 136° 03' 30"E - 22° 56' 30"S. In fact, much of the alluvium from the high ground to the north of the Plenty is "captured" by the Bundey and Marshall Rivers and their tributaries and actually by-passes the Plenty.

Between the western and eastern limits of the EL, the sediment input to the Plenty from the south is also minimal. To the west of the EL the sediment input to the Plenty is exclusively derived from the rocks of the Harts Range Group and comprises the mainly garnetiferous Irindina Gneiss and Riddock Amphibolite.

The Entire Creek, which empties into the Plenty at around 135 17' 40" some 50km west of the EL, however, is demonstrably garnetiferous (deriving this mineral within the Huckitta Dome, from large exposures of Irindina Gneiss; see the first annual report for

EL8829, 1996). This recharge is the last flux of garnet into the Plenty. As the river flows east, and begins to derive progressively more of its alluvial load from the southern (non-garnetiferous) flood plain, garnet grades will begin to drop eastwards, by dilution.

No purely geological mapping was carried out in any part of the EL in this reporting period. Written summaries of the regional geology of the areas encompassed by the EL is presented in the notes to accompany the Geology of the Strangways Range Region, and the Arltunga-Harts Range Special 1:100,000 geological maps. There is no equivalent in print for the Quartz Geological map, however the compilation notes appear as BMR Record 23, 1982, [Shaw *et al.*]. The previous geological summary was compiled directly from the above mentioned references, which are not presented here.

5 EXPLORATION

The area applied for in EL8423 was solely for the purpose of encompassing the Plenty River as can be seen in the nature of its shape. Previous reconnaissance over the entire length of the Plenty River contained within the EL demonstrated that the Plenty was everywhere garnetiferous.

The areas of the EL not the subject of continuing tenure was systematically traversed in an endeavour to locate feeder creeks, of sufficient and potential tonnage, not identified on geological or topographical maps however none was found. Subsequently no sampling was undertaken from areas not forming part of the Plenty River.

With respect to EL8423, Chambigne applied for a mineral lease over the entire river system within the EL, thus all of the blocks within this EL have now been surrendered.

50′ 135° 00′ 10′ 20′ 30′ 40′ 50′ 136° 00′ 10′

40′

50′

23° 00′

20′

10′

EL 8076

PROCESS PLANT

HARTS RANGE POLICE STATION

HOST ROCK

MINERAL LEASES
APPROX SAMPLE LOCATIONS

ENTIRE POINT

EL 8384

PLENTY RIVER

EL 8423

PLENTY HIGHWAY

MT EAGLEBEAK

ELA 9420

MT MABEL

EL 8829

MCSA 245
MCSA 246
MCSA 247
MCSA 248
MCSA 249

MINERAL CLAIM APPLICATIONS

MT LIONEL

ELA 8752

MT RUBY

EXPLORE\8423\
FINAL97\APP1.DWG

DRAWING NUMBER

APPENDIX PAGE 1

PRINT 24.0.16.0

CHAMBIGNE GARNET

LOCATION MAP OF
CHAMBIGNE TENEMENTS