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EL 4/61

RUTILE PROJECT
SAVAGE RIVER, TASMANIA

By

C.H.C. SHANNON

30-3-1988

with preface

14-2-89

& map

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| MINES | |
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Preface to rutile project report, H. Shannon, 14-2-1989

The "white rocks" (felsites) are known in the Whyte River/Rocky River prospect and at the Davis Creek prospect.

The work done on the prospects subsequent to the reduction of E.L. 4/61 on 22-2-1988 was concentrated on the former prospect which is accessible by road. It was anticipated that the ground would be picked up under the E.T.A. procedure but the company's circumstances changed rapidly so that the idea of even applying for the ground was abandoned, and the samples forwarded for mineral separation were not treated.

All work relating to samples from the retained portion of E.L. 4/61 has already been reported.

The new map included in this report has significant corrections in sample locations, the position of the lodes in the old mine workings, and geological mapping. The white felsites are identifiable with the "Sawpit Lode" of Wilks and the "cataclasite" of Urquhart.

After the mapping work on the area and the attempts to reconcile the conflicting results for titanium both the concept of a minable rutile deposit and the concept of a feldspar concentrate source were downgraded.

Rutile project: Status in March 1988

Introduction

Results from 3 heavy mineral concentrates extracted from decomposed felsite show potentially economic rutile content in contrast to the XRF whole rock analyses of some comparable point samples, and ICP analyses of channel samples from part of the same area. The ICP results are about half the XRF results and the XRF ^{about} ~~about~~ half the proportion calculated out from the heavy mineral descriptions, which are a direct measure of extractable rutile.

Explanations to test are (a); ^{if} the matrix factors for the ICP and to a degree also the XRF work were set for a basic volcanic composition and this produced errors when the rock was felsite, (b); ^{if} the assays are essentially correct and the higher rutile content is restricted to the whiter, more coherent felsite which makes up only a small portion of the rock mass.

History

The first hint that commercial rutile might be present in the area came from the thin sections 87/0183, a felsite from the Rocky River track with rutile present in volume proportion of 2-3%; and 87/0184, another felsite but from a small, possibly intrusive body in Jaffa Creek was also rather high in rutile, at 1-2% and had 77% feldspar. (Annett and Shannon, June 1987)

A series of whole rock analyses from the area done by XRF method 408 tended to downgrade the rutile prospects since weight proportion values of 1-2% TiO₂ were found instead of the 3%+ values anticipated from the thin section work. These were large point samples. (Annett and Shannon, December 1987, p A.2.1.1-2)

The results also showed that the feldspar had to be alkaline, usually albite (or in one case a K-feldspar), both with potential for ceramic use if all iron bearing minerals could be beneficiated out. The thin section indicated that practically all the iron was in the opaques (magnetite mainly) capable of being removed fairly easily from at least the semi-fresh rock.

Phosphorus content was high enough to mop up any calcium as apatite with a surplus of P₂O₅ indicating that other phosphate phases had to be present raising possibilities of a significant rare earth component as monazite or xenotime.

Since these analyses and the thin section came from the area of previous channel sampling and there were reserved pulps ^{available} some repeat assays were done by the ~~rapid~~ ^{rapid} but not altogether reliable ICP method 201 to check on major metals and rare earths. These assays showed a clear chemical division between the main felsite body and the ordinary (basic tuff) greenschist but a surprise was that the titanium values were much lower than anticipated, but were quite low

in the felsite and higher in the adjoining greenschist.

At this stage it was necessary to debate continuing tenure with the Mines department and they did not allow us to keep the ground and the values did not justify it.

As a supplementary approach 3 samples of known weight (400g) were panned down and examined here before being dispatched to the lab for TBE separation and consultant's examination. The rough examination showed that heavy minerals were abundant with a red striated mineral most common (later proved to be rutile, in poorly crystallized form) and a euhedral tetragonal stumpy dark brown resinous mineral which looked like a well crystallized rutile but was thought to be a separate species rather than a different variety at the time. The ICP values would imply a detectable monazite content, but monazite is not described by the consultant. There is also some magnetite and a moderately magnetic magnetic specular haematite in possibly useful quantity in one specimen.

The quantities present for rutile were substantial and calculate out to roughly 3% in 2 cases (87/1513; 87/1515) and 5% in the richest specimen 87/1517. this is possibly from the same area as the thin section 87/0184, but also from the area of a channel sample 87/0232 with only 0.477% Ti corresponding to 0.8% rutile.

There are unresolved contradictions between both sets of assays, and

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the thin section plus heavy mineral data.

Reliability

The heavy mineral extraction should be underestimating the rutile content since the rock was never completely disaggregated to start with and some loss in panning would be expected. Yet monazite may be included with the rutile. the low ICP Ti values in the felsites may simply arise from using the matrix factors for mafic rocks when the rock assayed was a felsite or perhaps there is a calibration error.

It may also be the case that high rutile content is restricted to the more obviously light specimens chosen for sampling. More common is a soft saprolite with speckles of a green mafics

The prospect will only work if there is sufficient strike width of ore grade rock present. To make it the less distinctive messier felsites will have to prove ore grade.

Work program

Some channel samples have been taken to provide enough material for the representative heavy mineral concentrate approach which is considered the most realistic. These are being divided with reference material retained at Savage River and 1kg+ splits sent to Marafield Ltd for an industrial mineral separation approach to

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determine ore grades and products, mainly for rutile but with the object of checking if other products are practicable. Micaceous haematite, low thorium monazite, zircon and alkali feldspars are possibilities potentially leading to a minable deposit in combination even if the rutile alone cannot carry a development.

Some geological mapping had to be carried out to allow the felsite beds in the hairpin bend area to be matched with the Hay's shed track. The strike is abnormal in this area and there appears to be some faults. The base map is misplotted on magnetic not grid north. Strike width is of the order of 50m for the main felsite zone which is split by a basic tuff. The basic tuffs between the felsite and the magnetite have the highest Ti contents in the ICP assays but have been looked at for heavy minerals showing abundant magnetite but no rutile. It may be that the Ti is present as fine grained sphene, which was lost in panning. There appears to be no rutile when magnetics are abundant. Basic tuff has the magnetics, felsite is low in magnetics but has its Ti content as rutile.

Prospects

There seems little doubt that the felsite is a tuff and in the local geological context is likely to be a persistent unit. Its position is above the basal chlorite schist beds of the Bowry Formation and below the Savage River iron ore horizon and the Main Creek Magnesite. There is a good prospect of a rutile bearing zone

persisting for large distances if this model is correct.

Sample notes

Hairpin Bend Locality

section starts at base of distinctive pyritic pale green schist

88/0011 white coherent leached felsite with breccia texture, approx 0.5m strat. sect; Traverse posn. 144-145, sampled as 87/0184 thin section?, 87/0321 channel sample includes the interval in 5m of traverse section.

88/0012 dirty soft leached felsite 1.2m str. sec. trav. 145-147, part 87/0232

88/0013 as above 147-148, part 87/0232 ~~and~~

88/0014 as above 148-153, part 87/0232, 0233

schist bed not sampled

88/0015 dirty felsite saprolite; traverse interval 156-162, included in channel sample 87/0254 in part.

gap of approx 10m in strat. section

88/0016 dirty felsite saprolite, traverse interval 3-12, in samples 87/0235, 0236; also 87/1516.

section ends at blocky basic tuff (amphibolite) bed.

The bed is about 25m stratigraphic thickness. Another bed of comparable thickness provided samples 87/1514, 1515.

Lower Track locality

Section starts at the base of the pale green pyritic schist marker

in section sampled previously as 87/1513

88/0017 blocky buff felsite grading to dirty felsite saprolite; traverse 92-99, corresponds to 88/0012, 0013.

Additional samples from approach to hairpin dispatched April 1988

88/0018 sandy felsite saprolite with minor basic tuff and schist, traverse 30-55, part in 87/0240

88/0019 sandy and minor blocky felsite tuff, includes 87/1515, and channel samples 87/0241-0244, traverse 55-75

note: with a decision made, not to reapply for the ground these samples were never tested.

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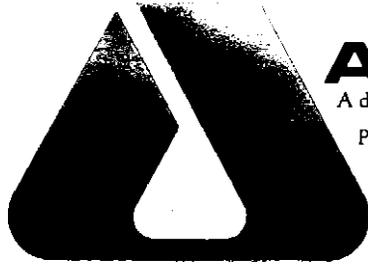
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26th February, 1988

Following are the results of 3 sand samples for Mineralogy,
TBE Separation and Magnetic Separation.

*(note: panned extracts from 400g samples of
roughly crushed rock.)*

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INTRODUCTION:

| | | | |
|-----------------|-----------|---------|---------|
| TRE Separation. | Wt% Sinks | | |
| | 87/1513 | 87/1515 | 87/1517 |
| | 27.5 | 31.9 | 22.7 |
| Mag. Separation | Wt% Mags. | | |
| | 2.4 | 7.2 | 2.2 |

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Mineralogy:

Sample 1513

Polished Sections (2)

Mags. Magnetite>Goethite>Hematite>Rutile>Chromite.

The rutile content would be between 5 and 10%.

| Non mags. | Vol% |
|-----------|--------|
| Goethite | 45-55% |
| Rutile | 45-55% |
| Magnetite | <1% |
| Hematite | <1% |
| Pyrite | <1% |
| Zircon | <1% |

The hematite contains about 10% rutile as composite material, not included in the rutile figure sensu stricto.

Sample 1515

Polished Sections (3)

Mags.

| | |
|-----------|----------|
| Hematite | Dominant |
| Magnetite | Trace |

The hematite contains about 10% inclusions of rutile.

Non Mags.

| Fines | 55% wt% | Coarse | 45% wt% |
|------------|---------|----------|---------|
| Rutile | 44.5 | Rutile | 51.5 |
| Hematite | 25.4 | Hematite | 15.6 |
| Goethite | 4.9 | Goethite | 31.8 |
| Tourmaline | 7.1 | Other | 1.1 |
| Amphibole | 6.5 | | |
| Lights | 11.6 | | |

Sample Split at 0.6mm.

Sample 1517

Polished Sections (2)

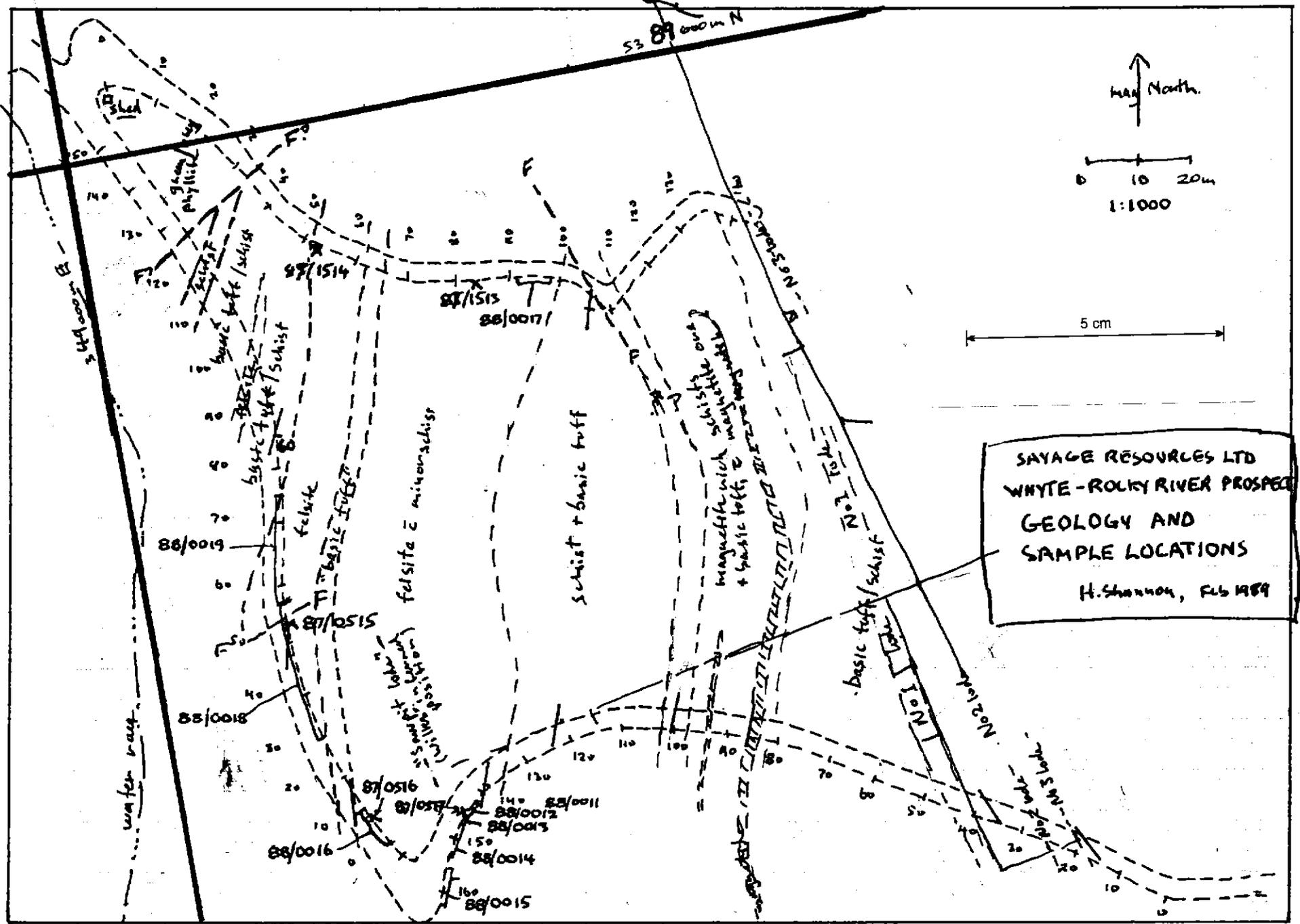
| Mags. | vol% |
|-----------|-------|
| Goethite | 45% |
| Hematite | 25% |
| Magnetite | 20% |
| Rutile | 10% |
| Chromite | trace |

| Non Mags. | vol% |
|-----------|------|
| Rutile | 98% |
| Hematite | 1% |
| Pyrite | <1% |
| Zircon | <1% |

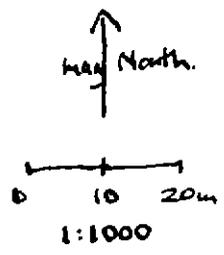
Note that the rutile can have quartz attached as margins.

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SAYAGE RESOURCES LTD
 WHYTE-ROKLY RIVER PROSPECT
 GEOLOGY AND
 SAMPLE LOCATIONS
 H. Shannon, Feb 1989



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