SAVANNA MINERAL RESOURCES PTY LTD

BACHELOR PROJECT

NORTHERN TERRITORY

E.L. 9918

ANNUAL REPORT

FOR PERIOD

10th March 1998 to 9th March 1999

1st Year of Tenure

Compiled by:
B J UREN
April 1999
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SUMMARY

E.L. 9918 is considered to be prospective for gold deposits similar to those which occur to south of the E.L. in the Pine Creek Geosyncline. The rocks covered by the E.L. include the Burrell Creek Formation which is prospective for gold hosted by quartz veins and the South Alligator Group which is prospective for gold in sulphide rich stratiform deposits.

The area has been covered by systematic BLEG sampling by previous explorers. This work identified a limited number of minor anomalies which have been adequately followed up without further encouragement.

The remaining potential lies in the covered areas which dominate the southern part of the licence. These should be tested by RAB drilling with emphasis on the along strike extensions of anticlines mapped to the N.
1. **INTRODUCTION**

Exploration Licence 9918 is one of many held by Savanna Mineral Resources Pty Ltd in the Batchelor district of the Northern Territory. Savanna is a wholly owned subsidiary of Mt Grace Resources NL.

The E.L. was acquired due to it perceived prospectivity for gold in the South Alligator Group rocks and the overlying Burrell Creek Formation, both of which have been productive further to the south in the Pine Creek Geosyncline.

2. **TENEMENT STATUS**

E.L. 9918 was granted for a period of 6 years on 10 March 1998 and covers 18 graticular blocks. The E.L. is held solely by Savanna Mineral Resources Pty Ltd as part of an extensive land holding in the Batchelor District which has mostly been very actively explored in the last year. The location of the tenement is shown on Figure 1.

3. **REGIONAL GEOLOGY & MINERALISATION**

The E.L. dominantly covers rocks of the Lower Proterozoic South Alligator Group. These rocks and the overlying Burrell Creek Formation are mostly fine grained sediments as described on the stratigraphic column Table 1 and shown on the geological sketch map presented as Figure 2.

The regional geology is represented on the excellent quality B.M.R. 1:100,000 map entitled “Geology of the Rum Jungle Uranium Field” (Crick 1987).

Archaean basement is exposed in the cores of the Rum Jungle and Waterhouse domes located to the west of the E.L. The Lower Proterozoic sediments dip gently to moderately off the domes and are dominated by siltstones and sandstones with lesser carbonate horizons. The age of the Pine Creek Geosyncline is constrained between 2470 and 1870 Ma (Page et al 1980). The rocks are folded about N-S oriented axes and the metamorphic grade is sub-greenschist facies. The sediments are intruded by sills of Zamu Dolerite and, well beyond the project area, by granitoids of 1800 – 1850 Ma age. The deformation post dates the intrusion of the granitoids.

Geophysical data (Tucker et al 1980 and Lewis et al 1995) suggest that granite rocks are present virtually everywhere in the Pine Creek Geosyncline at a depth of 1 – 5 km. The geophysical data cannot however distinguish between the Archaean basement and the Lower Proterozoic granites (Ahmed 1998).

Regionally the Pine Creek Geosyncline has been economically productive. Significant deposits have been worked for U, Zn/Pb and Au whilst a significant Pb/Cu/Co/Ni prospect (Brown’s) is under feasibility study. The uranium, Pb/Zn and Pb/Cu/Co/Ni mineralisation occur at the same stratigraphic horizon being the Whites Formation (Black Shale)/Coomalie Dolomite contact. Savanna is currently evaluating
<table>
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magnesite in the Coomalie Dolomite for its suitability for use in the production of magnesium metal.

Significant Au deposits have been discovered in the upper portion of the Lower Proterozoic stratigraphy. These are located to the SE of the E.L. There are two dominant styles of mineralisation as described by Nicholson & Eupene, 1990.

♦ STRATIFORM MINERALISATION

Examples of this style include the mineralisation at Cosmopolitan Howley, Golden Dyke Dome, Iron Blow and Mount Bonnie. All significant known deposits occur in the South Alligator Group, although showings are also known in the upper Mount Partridge Group and the Cahill Formation and equivalents. This mineralisation has the following characteristics:

- Individual lenses are closely conformable to bedding.
- Gold concentrations are invariably accompanied by sulphide concentrations of over 5%. Pyrite and arsenopyrite are the most common sulphide minerals.
- Sulphide stratification is common and varies from finely laminated to almost massive textured.
- Discordant quartz-sulphide-carbonate veins up to 2 cm thick comprise up to 5% of mineralised beds. These veins appear to be preferentially associated with conformable beds of coarse arsenopyrite and pyrite euhedra.
- Component minerals show the effects of regional deformation.
- In most localities more than one ore lens is present. Lenses are clustered in the same stratigraphic interval and/or stacked across the stratigraphy.
- Most deposits are hosted by iron formation or carbonaceous mudstone beds.
- Centres of stratiform mineralisation often coincide with facies containing bedded tourmaline bearing rocks.
- Mineralisation is often located in zones of stratigraphic thickening.
- The majority of know stratiform deposits is located on or near major anticlinal axes.
- Two compositional types occur; gold-arsenic rich, and lead-zinc-silver-tin-minor gold deposits.
- Tightly folded stratiform mineralisation contains massive textured, upgraded zones. Mineralisation may also be upgraded to faults.

A syngenetic-diagenetic origin for the stratiform deposits is indicated by their conformable, often finely bedded nature and their apparent close association with the surrounding stratigraphy. The veining and associated coarse sulphide generation in some mineralisation suggests at least some mineralisation or remobilisation after sedimentation.

The massive textured, upgraded zones in intensely folded areas indicate some remobilisation during regional deformation. However, the presence of high grade mineralisation in planar, unfolded beds, e.g. at the Golden Dyke mine, indicates this remobilisation is not necessary to produce ore grades.

Disseminated pyrite-arsenopyrite-gold mineralisation is known in several locations within granophyric phases of the Zamu Dolerite, but no significant production has
come from deposits of this style. These deposits have only been found in areas of known stratiform mineralisation and may have been formed by the assimilation of this material and subsequent concentration into acid differentiates.

**QUARTZ VEIN AND STOCKWORK MINERALISATION**

This is the economically most important style and includes mineralisation at the Enterprise, Goodall, Woolwonga, Tom's Gully, Union Reefs, Moline/Northern Hercules and Mount Todd mines.

Vein systems are commonly found along or close to the axes of major anticlines. Cleavage parallel, 0.5 to 5m thick, lamprophyre dykes often occur within the vein systems. In place the veins appear to post-date the dykes. Unoxidised veins are composed of the following minerals, in order of decreasing abundance: quartz, ankeritic carbonate, pyrite, alkali feldspar, arsenopyrite, muscovite, chalcopyrite, galena, sphalerite, pyrrhotite, antimony and bismuth sulphosalts, tetrahedrite, tennantite and gold. Gold appears most closely associated with sulphidic, and especially arsenopyritic, veins.

Veining is commonly associated with pervasive sericitisation and silicification and less commonly carbonatisation, chloritisation and sulphide impregnation. This style of mineralisation is restricted to the South Alligator, Finniss River and possible El Sherana groups. Two forms of veining occur, commonly together:

1. Continuous veins are 5 cm to 5 m thick and are usually oriented parallel to bedding or cleavage. These veins may be continuous for several hundred metres, contain 10 to 80% sulphides and commonly grade 3 to 15 g/t gold.

2. Stockwork veins occur in bodies generally elongate parallel to bedding or cleavage. Stockwork zones may attain thicknesses of over 30m, while individual veins generally range from 1 mm to 10 cm in width and comprise 5 to 20% of the host rock. Most veins occur parallel to bedding or cleavage. Stockworks are hosted by greywacke and chert rich sequences, or sills of Zamu Dolerite. Veining is often terminated by thick mudstone units.

The stockwork style mineralisation can also be subdivided on gold grain size. Fine grained deposits have most of their gold content as grains less than 50 μm in diameter. The sulphide content is relatively high and old hard rock and alluvial workings are often insignificant.

Coarse grained stockwork deposits have a significant proportion of their gold as grains greater than 0.5 mm in diameter. These deposits appear very similar to their finer grained equivalents apart from a lower sulphide content. The coarse grained stockwork mineralisation was worked extensively last century and was the source of most of the gold won from alluvial deposits. However, although this stockwork mineralisation could be treated very cheaply by gravity methods, economic reserves have not been proven, either because of problems in evaluation caused by irregular grades or because these deposits have a much lower overall gold grade.

The vein and stockwork style deposits were probably formed as a result of metamorphic dewatering. Water retained in the sequence during the peak of
metamorphism caused hydraulic fracturing and mineralisation during uplift. The gold may have originated from stratiform concentrations lower down the sequence, on the same anticline.

4. **PREVIOUS EXPLORATION**

A thorough compilation has been made previous exploration on the area covered by E.L. 9918. A description of this work is provided below chronologically.

**E.L.s 995 and 739 Amax, (Wyatt & Braham, 1977)**

These Els which covered almost all the area of E.L. 9918 were explored for uranium. See Figure 3 for their location.

The relevant significant work undertaken included:
- The production of a 1:25,000 geological map reproduced here as Figure 6.
- A low level airmag survey over part of the area which is reproduced here at 1:25,000 as Figure 7. This survey had the following specifications:
  - Flight Height: 90m
  - Reading interval along line: 33m
  - Contour interval: 10nT

The flight line spacing is unknown.

The magnetics show a very distinct contrast across a structure annotated as the Coomalie Fault on the geological map. This N.E. striking feature has the South Alligator Group to the east and the Mt Partridge Group to the west. The Mt Partridge Group is characterised by a complicated high relief character whilst the South Alligator Group has a subdued character. Only the N.W. corner of E.L. 9918 has been covered by the airmag survey.

The report refers to a second low-level airmag survey which covers the area to the E of the one described above but a copy of this has not been able to be obtained through the Mines Department Library.

**E.L. 1471 CRA, (Ikstrums, 1979)**

This E.L. covered just 2 blocks of E.L. 9918 which have no outcrop except for a minor amount of Burrell Creek Formation in the S.W. most block of E.L. 9918. For the location of this E.L. see Figure No. 3.

A 1:25,000 scale map was made and soil samples on a grid with line spacings of 1 km and sample spacing of 50m was completed. The soils were analysed for Cu, Zn, Pb, Mn and no significant results were obtained.

Rock chip sampling was undertaken during the mapping. These samples were analysed for Cu, Pb, Zn, Mn, Ag, Sn, U and Au. No anomalies in E.L. 9918 were recorded.
E.L. 1983 CSR Ltd, (K Hamilton, 1984)

This E.L. covered the top 4 blocks of E.L. 9918 – see Figure 3.

Work commenced with gridding, mapping at 1:25,000, radiometric traversing and rock chip sampling. This was followed up by trenching, shallow drilling and a SIROTEM survey.

A geochemical anomaly found in 2 trenches and a SIROTEM anomaly were the only two prospects worth testing.

The SIROTEM anomaly was tested by a diamond drill hole. The diamond hole intersected ferruginous siltstones with milky vein quartz, siliceous, pyritic siltstones and mudstones with cleavage filling quartz veins up to 2 cm thick. On the outside of the quartz a layer of pyrite is commonly present with occasional galena, sphalerite, arsenopyrite and chalcopyrite. The best intersection in this hole was 2m of 1.29% Pb, 0.24% Zn and 0.3 g/t Au.

The geochemical anomaly was tested by two lines of shallow inclined percussion drill holes. Siltstones with milky quartz and veins of oxidised sulphide were intersected. These had minor scattered elevated geochemical values with the best results being 1.02% Pb and 0.9 g/t Au.

No further work was done on the E.L.

E.L. 2022 Mines Administration Pty Limited, (G Hessall, 1981)

Part of this E.L. covered the central part of E.L. 9918 – see Figure 4. The only work undertaken was mapping at 1:25,000 and a small number of rock chip samples which were not assayed for Au and which had no anomalous base metal values.

E.L.s 2160 and 2161 Uranerz Australia Pty Ltd, 1981

These two E.L.’s covered the southern and part of the western blocks of EL 9918 (see Figure 4).

The area was mapped at 1:25,000 scale and 13 rock chip samples were collected. None of the rock chip samples were of interest. A scintillometer was carried and monitored during mapping. They only elevated values were obtained over laterities and these were deemed to be of no interest.

This irregular shaped E.L. cover the central part of E.L. 9918 as shown on Figure 4.

BLEG sampling located two anomalies in the area of the current tenement. These were called the Mt Gunn and Coomalie Prospects.

At Mt Gunn value up to 3.4 ppb were returned and rock chip sampling returned a maximum value of 0.46 g/t. As the area is well exposed and has little sign of alteration the area was not pursued.

At the Coomalie Prospect first pass BLEG sampling returned a high of 2.5 ppb Au. Follow up sampling returned no better value and rock chip sample results were all low.


This E.L. covered all of the southern 3 rows of blocks of E.L. 9918 as shown on Figure 5.

The area was covered by systematic regional BLEG stream sediment and rock chip sampling surveys. None of the significant values initially obtained were able to be reproduced in the area of E.L. 9918.


The southern most row of blocks of EL 5106 are the same as the northern most row of EL 9918 as shown on Figure 5.

The area was subjected to a regional BLEG stream sediment survey and rock chip sampling. From this the Octa anomaly was obtained which contained both elevated base metal and gold values in strongly ferruginous and gossanous sediments, chert beds and quartz veins. The prospect was covered by 100 x 25m soil geochem survey which highlighted a number of weakly anomalous zones of Au (max value 0.78 g/t), Cu (max value 172 ppm) and Zn (max value 260 ppm). The anomalies were followed up by 3 costeans the sampling of which gave negative results. No further work was undertaken.

EL 7079 Luxton & White (Earthowl, 1993).

This 2 block E.L. covered two blocks located in the N.W. part of E.L. 9918 as shown on Figure 5.

Fourteen stream sediment samples were collected. None were anomalous.
E.L. 9256 Earthrowl & Sherwood (Earthrowl, 1996).

Most of this E.L. was coincident with the southern portion of E.L. 9918 as shown on Figure 5.

A total of 34 rock samples and 6 BLEG samples were collected. The only anomalous result was 140 ppb Au from a BLEG sample taken at the intersection of the natural gas pipeline and Glen Luckie Creek. Resampling gave values of <0.05 and 2.35 ppb Au.

5. CONCLUSIONS & RECOMMENDATIONS

The area of the E.L. has been adequately tested by systematic BLEG sampling. The few minor anomalies located have been followed up and found to be of little consequence.

The potential of the E.L. lies in the covered areas which is dominantly the southern half of the E.L.

A programme of RAB drilling should be designed to test this area with particular emphasis on the strike extensions of anticlines.

6. EXPENDITURE

Expenditure has been well below the covenant. This is due to the vast majority of the companies efforts and resources being expended on exploration for magnesite in the Batchelor district. Very significant amounts of money have been spend on these tenements. In 1998 in excess of 13,000 m of reverse circulation drilling was done in the district.

Expenditure 10.3.98 to 9.3.99

<table>
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<tr>
<td>Aerial Photography</td>
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<tr>
<td>Maps &amp; Drafting</td>
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<td>Delivery</td>
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<td>Consumables</td>
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<td>Tenement Administration</td>
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$4,009.32
7. **PROGRAMME FOR 1999 – 2000**

A programme of RAB drilling is required over the covered areas of the licence. Such a programme would require the following expenditure:

- Geologist: 4,000
- Analytical: 5,000
- RAB Drilling: 12,000
- Line Clearing & Gridding: 4,000

**$25,000**
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