EXPLORATION LICENCE 4578

ANNUAL REPORT

NORTHERN TERRITORY GEOLOGICAL SURVEY

CR86/076
ANNUAL REPORT

LICENCIeE: HALL, B. & CLEARY, C.
OPERATOR: NARON INVESTMENTS
LICENSE NUMBER: 4578
MAP SHEET: DARWIN SD52-4 (1:250,000)
            NOONAMAH 5172 (1:100,000)

Report prepared by GEOMERCE, Darwin.
SUMMARY

Results of sampling during this report period in the southern part of the area have been encouraging and more detailed hardrock sampling together with bulk testing of elluvial deposits is planned for the 1986 season.

The central lateritic portion of the EL remains largely untested and will be the subject of systematic sampling followed by bulk testing of selected areas if warranted.

Sample results from drainage in the northern part of the area have been disappointing but warrant further checking.
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1. INTRODUCTION

1.1 GENERAL

Exploration Licence 4578 is located approximately 90 Km south-east of Darwin and 13 Km south-west of Mount Bundey Homestead. Access is via the Arnhem Highway to Mount Bundey and thence south-eastwards along a gravel road to a camp site in EL 4773 which lies immediately south of EL 4578. One or two creeks that cross this gravel road may flood from time to time during the wet season preventing access for short periods.

The licence area straddles a watershed between the Marrakai Creek which drains north-westwards into the Adelaide River and the east draining tributaries that flow into the Mary River via Mount Bundey Creek.

Approximately one third of the area is relatively flat, lateritic plateau, the remainder being dissected upland. Light to moderate woodland covers most of the EL.

1.2 TENEMENT

EL 4578 was granted on the third of September 1984 to Ben Hall and Cameron Cleary for a period of six years. The area covers a one minute block between latitudes 12°54' and 12°55', and between longitudes 131°29' and 131°30', which is an area of approximately 3.4 square kilometres.

Figure 1 shows the location of the EL which is one of a number of tenements in the area held by Hall and Cleary: these are shown on Figure 2. All lie within the area of Mount Bundey Pastoral Lease P.L. 931.

Naron Investments of Darwin have acquired an interest in the Hall / Cleary tenements and are operators for EL4578.
LOCATION MAP ELs 4578, 4773

NORTHERN TERRITORY GEOLOGICAL SURVEY

FIGURE 1
1.3 OBJECTIVES

Exploration within EL 4578 forms part of a larger programme that takes in the other tenements in the area that are held by Hall and Cleary (see Figure 2). Auriferous quartz veins and alluvial deposits occur to the south within EL 4773 and the various mineral leases, with extensions into the area covered by EL 4578. Geological structures run through the area on north-south trending axes that may have exerted some control on mineralisation and the objectives of exploration within EL 4578 are to search for, locate and evaluate any northward extension of the known mineralisation and alluvial deposits. The area has been referred to as the piggie area.

1.4 PREVIOUS EXPLORATION

The Pig Hole mine is referred to by Walpole et al. (1968) as follows:

"The Pig Hole mine, 10 miles south-east of Marra Gai homestead is thought to have been a small gold producer in the early years of this century, but no details are available. It is reported to have produced 15 oz of gold in 1940."

In the 1940's a small stamp battery was set up at a locality known as Piggie on the Mount Bundey Creek. Several sulphidic units and small conformable lensoid quartz reefs were opened up at this time, but only to maximum depths of a few metres. It has been estimated that a total of no more than a few hundred tonnes of material was excavated and probably only a hundred tonnes or so actually treated.

In 1978-79 Engineering Excavations N.T. Pty Ltd completed fourteen costeans in the Rustler's Roost area of ELs 4578 & 4773: sampling of small thin quartz veins and semi concordant reefs yielded results that ranged from 0.2 to 380 ppm gold. Mapping, costeasing and sampling were subsequently carried out by Aurex Pty Ltd.
Quartz samples collected in the same period by Australian Anglo American, from the Annie Oakley area (on the western boundary of EL 4773) returned less than 1.5 ppm gold. They also sampled sulphidic siltstones from the Beef Bucket area and obtained 43, 90 and 93 ppm Au from three samples as well as elevated Pb, Cu, Zn and As.

Hall and Cameron have prospected the area since 1977 and have detected gold in previously untested sulphidic siltstones as well as in quartz reefs. Bulk sampling of alluvial material from the Backhoe area, near the centre of EL 4773 has indicated grades that will support a small alluvial mining operation.

Results are available for four samples collected by Aurex near the northwestern corner of the EL, although three of the four samples appear to lie just outside the boundary of the licence area. These results are tabulated below:

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Description</th>
<th>Sample type/width</th>
<th>Au</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0434</td>
<td>Concordant, laminated quartz reef.</td>
<td>Chip / 120 cm.</td>
<td>0.09</td>
</tr>
<tr>
<td>A0468</td>
<td>Sulphidic (70%) cherty siltstone.</td>
<td>Chip / 37 cm.</td>
<td>0.04</td>
</tr>
<tr>
<td>A0469</td>
<td>Sulphidic (30-40%) chert.</td>
<td>Chip / 18 cm.</td>
<td>0.03</td>
</tr>
<tr>
<td>A0470</td>
<td>Laminated sulphidic (80%) siltstone.</td>
<td>Chip / 48 cm.</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Results are in ppm, by AAS.

The main effort by Aurex was concentrated in the area immediately south of EL 4578. Five samples were collected from the Rustler's Roost area but within EL 4578, and a further five from the Dolly Pot / Sweat Ridge area, with one in between. Results are tabulated below and a copy of the relevant Aurex map with sample locations is included as Appendix 1.
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Description</th>
<th>Sample type/width</th>
<th>Au</th>
<th>As</th>
</tr>
</thead>
<tbody>
<tr>
<td>AO436</td>
<td>No result.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO437</td>
<td>Sulphidic siltstone (30-40% sulphides). Grab, aggregate.</td>
<td>0.04</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>AO438</td>
<td>Sulphidic siltstone (20-40% sulphides). Grab, aggregate.</td>
<td>0.02</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>AO439</td>
<td>No result.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO440</td>
<td>Concordant quartz + minor ironstone.</td>
<td>Chip / 32cm.</td>
<td>0.06</td>
<td>59</td>
</tr>
<tr>
<td>AO444</td>
<td>Concordant laminated milky quartz, siltstone inclusions.</td>
<td>Chip / 42cm.</td>
<td>0.21</td>
<td>32</td>
</tr>
<tr>
<td>AO445</td>
<td>Sulphidic (50-90%) siltstone (25cm.) and red-grey shale.</td>
<td>Chip / 55cm.</td>
<td>5.00</td>
<td>1400</td>
</tr>
<tr>
<td>AO455</td>
<td>Laminated sulphidic (40%) cherty siltstone. Chip / 16cm.</td>
<td></td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>AO456</td>
<td>Laminated sulphidic (25%) chert</td>
<td>Chip / 24cm.</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>AO457</td>
<td>Laminated sulphidic (80%) siltstone. Chip / 32cm.</td>
<td></td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>AO458</td>
<td>Laminated sulphidic (50%) cherty siltstone. Chip / 25cm.</td>
<td></td>
<td>2.15</td>
<td></td>
</tr>
</tbody>
</table>
2. GEOLOGY

2.1 GENERAL

The area lies within the Pine Creek geosyncline and contains rocks from the upper part of the Proterozoic sedimentary sequence.

The regional geology of the pnie Creek geosyncline has been described by Needham et. al. (1980) in the Proceedings of the National Uranium Symposium on the Pine Creek Geosyncline and recent mapping on a 1:100,000 scale by the BMR and NTGS is available over the area (Noonamah and Mary River sheets).

2.2 STRATIGRAPHY

Published geological maps show the area of EL 4578 to be comprised of a sequence of pelites, greywacke and tuffaceous sediments of the Mount Bonnie Formation. A plateau of Cainozoic (Tertiary) laterite resting on the Mount Bonnie Formation occupies approximately one third of the licence area.

The Mount Bonnie Formation belongs to the Lower Proterozoic South Alligator Group, conformably overlying the Gerowie Tuff and in turn conformably overlain by the Burrell Creek Formation (Finniss River Group) which outcrops in the southern part of EL 4773. The Mount Bonnie Group is regarded as transitional between the South Alligator and Finniss River Groups as it contains interbedded greywacke and shale which dominate the Finniss River Group.

The lithologies have been described by Aurex Pty Ltd from the mineralised area to the south:

"The dominant rock type is a grey laminated siltstone accompanied by lesser shale and minor thick bedded wacke. Graded bedding, scours and asymmetric ripple forms have been observed. Small (1mm) carbonate rhombes are scattered through some siltstone. Both siltstone and shale may be
red to buff in colour. In some places this is clearly a function of position in a duricrusted (lateritic) profile, but elsewhere it may relate to a primary ferruginous nature.

A particular stratigraphic zone within the siltstone dominated sequence (corresponding to the upper Mount Bonnie Formation) is characterised by sulphidic and cherty siltstones. These siltstones range from types with scattered sulphidic cubes and ferruginous laminae to those composed of 75% or more fine grained laminated sulphides. All sulphides are oxidised in outcrop. A laminated cherty siliceous component is present in most sulphidic siltstones and in many cases forms the bulk of the rock. Variable recrystallisation has converted the chert to massive, vitreous quartz with an accompanying loss of lamination. The chert is commonly nodular or lenticular in form.

Unfortunately the sulphidic siltstone units are very thin, none observed being more than 50 cm thick; the common range of thickness is 10 to 30 cm. Multiple sulphidic units are common over outcrop widths of 20 to 50 metres. More closely spaced units (over a few metres) are uncommon, a good example being the Dolly Pot Prospect where 3 units 10 to 40 cm thick occupy a total stratigraphic thickness of about 1.5 to 2 metres. The lateral extent of sulphidic units may be a kilometre or two but is commonly less. The conformable quartz reefs are up to 1.5 metres thick and 500 metres long.

The shale is intergradational with siltstone, but the wacke forms more distinct beds up to about 50 metres thick. These beds appear to be lenticular with small strike extent, but they were given little attention in the mapping. Wacke beds a few metres thick immediately underlie (e.g. Sweat Ridge) or overlie (e.g. Rustler's Roost) some sulphidic siltstone units."
GEOLOGY OF ELs 4578, 4773

Undifferentiated Cainozoic sediments

- Quartz sand, clayey soil, quartz vein float
- Nodular, concretionary, pisolitic and vermicular laterites

BURRELL CREEK FORMATION: Siltstone, shale, greywacke, quartz pebble conglomerate

MOUNT BONNIE FORMATION: Reddish-brown siltstone and shale with minor interbeds of tuffaceous siliceous siltstone, banded iron formation, greywacke and rare siltstone beds containing chert nodules
2.3 STRUCTURE

The area is located close to the northern margin of a broad synclinorium which extends southwards to Pine Creek and westwards to Batchelor. The extensive sediments of the Burrell Creek Formation occupy the the centre of this basin.

Mineralisation is common on the southern flank of the basin and contains numerous small stratiform gold deposits within the South Alligator Group (e.g. Cosmopolitan Howley, Golden Dyke). However these deposits occur in the Koolpin Formation which underlies the Gerowie Tuff and are therefore at a lower stratigraphic level than the rocks within EL 4578.

A number of fold axes run through the area, generally plunging slightly west of south along gently curving north-south axes. Plunge angles are low to moderate and closures rounded. Dips generally range between 50 and 80 degrees except in fold axial regions where 20 to 50 degrees is more general.

A steeply dipping cleavage is extensively developed parallel to the fold axes and quartz filled tension gashes may be present in wacke. More extensive discordant narrow quartz veins and silicified breccia zones are apparently relatively few in number.

2.4 METAMORPHISM

All the early proterozoic rocks in the region have been regionally metamorphosed to the lower greenschist facies. The metasediments show little alteration of their original texture and mineralogy. Typical metamorphic changes in the pelitic rocks are the development of fine-grained, weakly foliated sericite, microcrystalline quartz, chlorite and minor muscovite (Stuart-Smith et. al.).
2.5 ECONOMIC GEOLOGY

A number of small gold prospects have been worked to a limited extent within EL 4578 and the licence area lying immediately to the south, EL 4773. These are known as the Annie Oakley, Rustler's Roost, Sweat Ridge, Backhoe, Beef Bucket and Dolly Pot Prospects; their locations are shown on the Aurex map which can be found in Appendix 1.

The only mine of any size in the area is the Mount Bundey iron ore mine which was in production between 1968 and 1971.

Various base metal anomalies have been investigated in recent years by Geoeko, and gold was reported to the south of their Quest 29 lead prospect (Twist, 1977). This occurs at the surface in a lode 60m long and 1m wide, associated with small pyrite, pyrrhotite and arsenopyrite bearing quartz-feldspar pegmatites which intrude meta-sediments of the Koolpin Formation and bodies of Zamu Dolerite within the contact aureole of the Mount Bundey Granite.
3. EXPLORATION AND RESULTS

During the period covered by this report the main thrust of exploration has been directed towards the sampling of areas known to contain gold mineralisation. Two such areas that straddle the boundary between EL 4578 and EL 4773 to the south are the Rustler's Roost area and the Sweat Ridge / Dolly Pot area.

Bulk sampling of eluvial material from each of these areas has been carried out. Sub-economic grades were obtained from the Rustler's Roost area (0.3 grammes per cubic metre) with more encouraging results from the south-east corner of the EL (0.5 gm/cu.m.). The samples were processed through a sluicing plant erected within EL 4773 as part of a bulk sampling programme that included sampling of the Backhoe area. Problems that were experienced with the sluicing plant, including an inadequate water supply, lead one to assume that these figures can be improved on.

In the Sweat Ridge / Dolly Pot area rock chip samples have been collected by Ben Hall and dollyed prior to concentration by panning. Loam samples were taken in areas of poor exposure to test for extensions of auriferous horizons along the limbs of a south plunging anticline that may have exerted some control on mineralisation. Examination of the concentrates obtained from these samples for visible gold has given encouragement to proceed with more systematic and detailed testing of the area, to which end a 20 m grid has been laid out over the Dolly Pot anticline. This may be extended at some future date to take in the Sweat Ridge area and any northward extensions.

Running through the central part of the licence area is a lateritic surface from which small creeks drain to the north, and to the south through the Rustler's Roost and Sweat Ridge areas. The north draining creeks have been sampled by Ben Hall but results were generally disappointing, with little visible gold in the concentrates.
4. CONCLUSIONS AND FUTURE WORK PROPOSALS

A bulk sample from the Rustler's Roost area has yielded interesting results that provide encouragement for further testing of the alluvial potential in EL 4578.

Sampling over an anticlinal structure in the Dolly Pot area has indicated the need for a more detailed assessment of the area and a close spaced grid has been completed in preparation for more detailed sampling and air-track drilling which will test for extensions of the mineralised sulphidic siltstones into less well exposed areas to the north.

An extension of this grid into the Sweat Ridge area may be necessary in order to carry out similarly detailed testing along the south plunging synclinal structure that appears to run through the area, parallel to the Dolly Pot anticline.

The lateritic surface that runs through the central part of EL 4578 remains virtually un-tested; systematic sampling and geochemical analysis will be required to outline any areas of special interest prior to sampling on a larger scale.

Confirmation of the negative results obtained from the northern part of the EL will be sought by further sampling and laboratory analysis of the concentrates, but a low priority will be given to this part of the programme.

It is anticipated that an alluvial / elluvial treatment plant with Knelson concentrator will be in operation on EL 4773 during 1986 and full use will be made of this facility for the treatment of bulk samples of elluvial material from areas within EL 4578 that are outlined as being of primary interest. This testing programme will run concurrently with the mining operation planned for the Backhoe area. Total expenditure for year 2 is expected to be in the region of $10,000 for EL 4578, which will include geological consultancy fees, wages, hire of machinery and fuel.
5. REFERENCES


EL 4578


Hire of machinery $ 2,600.00
Wages $ 980.00
Fuel etc $ 1,020.00
Payments to Naron $ 800.00

TOTAL..... $ 5,400.00

Anticipated expenditure for Year 2: $ 10,000.00
E.L. 4578
ANNUAL REPORT
YEAR ENDING SEPTEMBER 1985.
HALL & CLEARY
ANNUAL REPORT E.L. 4578

GENERAL:

Exploration on the E.L. was conducted by the licence holders in conjunction with Naron Investments. Naron Investments have established a pilot plant located to the South of the E.L.

Exploration revealed one area of the E.L. which is considered economic for alluvial mining. The results from the remaining area were inconclusive. Low grades were encountered from in the costeans but much of the area is covered by ferocreti.

Exploration for the 12 month period was as follows.

(1) The digging of 5 costeans approx. 30 metres apart commencing at the Northern boundary of G.M.E. 228 B. and proceeding North.

(2) Material from the costeans was delivered to a pilot plant located on M.L. 656 (mapped)

(3) Three 6m samples were taken from each costean and the plant was cleaned after each was processed.

(4) Results from the program indicated sub-economic alluvial grades < .3 gram in this section of the E.L. (See Map).

(5) Grab sampling from the gully, as marked, was also disappointing, coupled with limited quantities of available alluvial.

(6) A grab sampling program in the South East corners of the E.L. (See Attached) was more encouraging. Two 6m samples both achieved > .5 gram per m., and the viability of taking out mineral leases in this area is being investigated.

MACHINERY USED:

(1) Ford D850 Tipper (6m.)
(2) Cat 933
(3) Landrover
(4) Auger Drill 4x4 mounted.
(5) Pilot Plant (Naron Investments)

EXPENDITURE

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hire of Machinery</td>
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<tr>
<td>Wages</td>
<td>$980.00</td>
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<tr>
<td>Full etc.</td>
<td>$1,020.00</td>
</tr>
<tr>
<td>Payments to Naron</td>
<td>$800.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$5,400.00</strong></td>
</tr>
</tbody>
</table>
Rustlers Roost
GML 228B

Possible
future mine.

CUntitled
Gully

131°29'
131°30'

Costeans

ML1798-18018

Mineral Claims
N646 to N663 inc.
(Appins)

EL 1473

12°55'

12°56'

12°57'

12°58'

MT BUNDEY
P.L. 561

Area to be worked
for alluvial gold by
Hall & Cleary

\xbar\text{shaded}