ANNUAL REPORT ON EXPLORATION LICENCE No. 940.

For the term from 29th August 1973 to 28th August 1974

Arafura Mining Corporation Pty. Ltd.

Wandaroo Mining Corporation Pty. Ltd.
Annual Report on Exploration Licence No. 946

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Map Sanders Rush area, Geochemical soil survey and results obtained.

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28th November 1974

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Introduction
This report is to summarize the work carried out by Arafura Mining Corporation Pty. Ltd. (Wandaroo Mining Corporation Pty. Ltd.) during the term of one year from 29th August 1973 to 28th August 1974, on the land of 78 square miles known as Exploration Licence No. 940.
The area is situated approximately at 75 kilometers north of Katherine and 50 kilometers west of Pine Creek. Access to the area is made through bush tracks of approximately 50 kilometers from the place to turn off to Edith Falls on Stuart Highway.
The area is inaccessible during the wet season of December to April because the trail brims over with full water at three big river crossings, Wolfram Creek near Wolfram Hill, Farrusson River at Crocodile Billabong and Tompson Creek at Davis Billabong, in addition to the boggy ground conditions in general land.
The company conducted prospecting by surface reconnaissance and geochemical soil survey. The area between Brilliant and Sander's Rush was prospected geochemically and other areas by reconnaissance. The work aimed to prospect for gold.

Geology
Sandstones and siltstones of Burrell Creek Formation here generally strike north west - south east and are highly folded. Regional metamorphism altered the siltstones to maroon weathering slates and in the outcrops these slate beds are predominant in the licenced area. This is probably due to slates being more resistant for weathering than other beds because of its siliceous nature. A cupola of Cullen Granite crops out near southeastern boundary of the licenced area and the beds are altered to hornfels near the cupola.
Mineralization

Hydrothermal veins of gold, copper, tin and wolfram are known to exist in the licenced area.

Wolfram was produced from Wolfram Hill Mines totalling about 700 tons of Wo3 concentrates in several places on one major shear striking 340 degrees. The copper lode west of the wolfram working strikes northwest and descends from a low hill into flat land. At four miles north of the Wolfram Mines, tin was worked at Crest of the Wave Mine on two parallel chlorite lodes in a strong fissure.

Old gold workings at Brilliant and Saunders Rush were observed by the writer. The showings are typical of Chinese diggings which were worked and abandoned early in the century.

All these Chinese diggings are characterized by extensive surfacing for alluvial and for some reefs. In these areas, it was reported previously that quartz veins itself looked very hungry, assayed with the results of gold to be nil or a mere trace. It was suggested by Dr. Jensen H.I. in 1912 and Mr. Hossfeld P.S. that gold in these areas probably had come from small shoots or small veinlets between quartz veins.

The writer support this opinion, so the work was aimed to discover quartz-iron stone type reefs consisting essentially of quartz and limonite in the secondary zone and of quartz and arsenopyrite in the primary zone, which were investigated by this company in the land of EL 229, rather than attempting to evaluate old Chinese workings at Brilliant and Saunders Rush.

Exploration geochemistry

The soil samples were collected from 254 places at Brilliant and between Brilliant and Sanders Rush. The positions spaced at intervals of 50 meters.

It was also attempted to collect screens of fragmental quartz pebbles from the same places of soil sampling and numbered 224. Samples were sent to the laboratory of Geochemical and Mineralogical Laboratories Pty. Ltd. Darwin. Soil samples were analysed by colorimetry method (H2O4) for arsenic values and quartz pebbles' samples by atomic absorption spectrophotometry method for gold values.
Fig 1
Cumulative frequency
GOLD IN QUARTZ SCREES

CUMULATIVE FREQUENCY %

Background values
Mixed values
Anomalous values
Below 0.02
0.02 to 0.04
0.06 to 0.08
0.10 to 0.12
0.14 to 0.16
0.18 to 0.20
Up to 0.40
GOLD
Discussion on the geochemical study of the quartz screees. There are so many screees of quartz pebbles on the surface in the licenced area. Quartz has the highest stability and the most resistant in the weathering process at the earth's surface. It must be possible to locate auriferous quartz reefs from the systematic collection and analysis of these screees. This is an experimental attempt from the above idea. The screees were taken from the areas of old gold workings at Brilliant and then 2 kilometers north of the old workings. The positions sampled are shown in the enclosed map. Screees numbered 224 and the results of chemical analyses by atomic absorption spectrophotometry method were as follows.

Table 1. Results on the quartz screees

<table>
<thead>
<tr>
<th>Ranges ppm</th>
<th>Number of samples</th>
<th>Per cent</th>
<th>Cumulative per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 0.02</td>
<td>28</td>
<td>12.5</td>
<td>37.5</td>
</tr>
<tr>
<td>0.02</td>
<td>56</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>0.04</td>
<td>88</td>
<td>39.3</td>
<td>76.8</td>
</tr>
<tr>
<td>0.06</td>
<td>33</td>
<td>14.7</td>
<td>91.5</td>
</tr>
<tr>
<td>0.08</td>
<td>8</td>
<td>3.6</td>
<td>95.1</td>
</tr>
<tr>
<td>0.10</td>
<td>1</td>
<td>0.44</td>
<td>95.54</td>
</tr>
<tr>
<td>0.12</td>
<td>2</td>
<td>0.89</td>
<td>96.43</td>
</tr>
<tr>
<td>0.14</td>
<td>3</td>
<td>1.33</td>
<td>97.76</td>
</tr>
<tr>
<td>0.16</td>
<td>2</td>
<td>0.89</td>
<td>98.65</td>
</tr>
<tr>
<td>0.18</td>
<td>1</td>
<td>0.44</td>
<td>99.09</td>
</tr>
<tr>
<td>0.22</td>
<td>1</td>
<td>0.44</td>
<td>99.53</td>
</tr>
<tr>
<td>0.44</td>
<td>1</td>
<td>0.44</td>
<td>99.97</td>
</tr>
</tbody>
</table>

Total 224 99.97

The cumulative frequency of the results was interpreted on a probability paper as shown in Fig. 1. The graph suggests background values of below 0.02 ppm to 0.06 ppm, mixed values of 0.06 ppm to 0.12 ppm and anomalous values of greater than 0.12 ppm.

The content of gold in common igneous rocks is 0.001 ppm. Thus the contrast between the anomalous values given by the above and the gold content in common igneous rocks (Ratio 0.12/0.001) is 120. It is concentrated 120 times in the anomalous quartz screees.

Suppose the content of gold in the workable ore is 10 ppm, the contrast between the workable content of gold and the anomalous values given by the above (Ratio 10/0.12) is 83.
Arsenic P.P.M.

**Fig 2**  *Cumulative frequency*

**ARSENIC IN SOIL SAMPLES**
The above work was carried out only in the limited areas shown in the map. This work itself was not successful to locate the places of quartz-iron stone type gold mineralization in the sampled area. However the writer believes that geochemical survey on the quartz screes is good means to locate possible areas of quartz reefs with gold mineralization from the above study. This study should be extended to the whole areas in the licenced land.

Discussion on the geochemical study of arsenic in soil

The residual soil samples were collected, numbered 254 samples and analysed by colorimetry method (HClO₄) for arsenic values. Table 2 shows the results of the analyses.

Table 2. Results on arsenic content in soil

<table>
<thead>
<tr>
<th>Ranges</th>
<th>Number of samples</th>
<th>Per cent</th>
<th>Cumulative per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>p.p.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 1</td>
<td>28</td>
<td>11</td>
<td>59</td>
</tr>
<tr>
<td>1 to 9</td>
<td>122</td>
<td>48</td>
<td>89</td>
</tr>
<tr>
<td>10 to 19</td>
<td>77</td>
<td>30</td>
<td>96</td>
</tr>
<tr>
<td>20 to 29</td>
<td>17</td>
<td>7</td>
<td>97.5</td>
</tr>
<tr>
<td>30 to 39</td>
<td>4</td>
<td>1.5</td>
<td>99</td>
</tr>
<tr>
<td>40 to 49</td>
<td>4</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>50 to 59</td>
<td>2</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>254</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It was indicated the low content of arsenic in the sampled area and all of these results belong under background values when the results of the study in Mt. Todd area are applied. The results in the sampled area were interpreted with cumulative distribution for arsenic as shown in Table 2. There were no anomalous values except negative anomalous values of below 1 ppm.

In Mt. Todd auriferous area, the data indicated background values of 0 to 65 ppm arsenic, mixed values of 65 to 125 ppm and anomalous values greater than 125 ppm from 574 samples in the 1973 study. Since then more samples were collected and it was interpreted more higher background, as background values of 0 to 100 ppm arsenic, mixed values of 100 to 250 ppm and anomalous values of greater than 250 ppm from the study of 779 samples in the 1973 and 1974 field season.
As a conclusion, anomalous areas on arsenic were not detected in the sampled area.

Discussion on an exploration programme in the renewal period (in 1975 field season)

This area under the licence was no longer accessible at the time of this report owing to the wet season conditions.

In the coming year, more work is necessary in the stage of the grass route exploration before locating favourable indications for ore deposits of economical sizes. Some indications are already shown in the old workings on gold, copper, wolfram and tin. The showing itself belong to small fracture and fissure veins and are with a limited promise.

Mineralizations no doubt exist, thus there is a possibility the mineralizations with economical sizes to have concentrated in the beds of some ideal host. Slates which take the majority of the earth's surface in the licenced area are by no means ideal host. Only small veins with limited economic importance could be found in such rocks.

It should be attempted to find the areas of massive quartz sandstones which are observed as the host for quartz - iron stone type mineralization (hypothermal gold veins) from the study in Mt. Todd area.

Concerning exploration geochemistry, geochemical study for the quartz scree as discussed in the previous chapter is worthwhile. In addition, several techniques of exploration geophysics should be tried in the area during the coming season and the results will be discussed at the end of the next field season.

Conclusion

The area of mineralization in respect of quartz - iron stone type gold veins were not located in the sampled area.

However it was suggested geochemical work on the quartz scree is efficient means for the future's work.

The work should be extended into whole areas in the licenced land in the renewal term of the licence.

REFERENCES

Walpole B.P. Explanatory notes Mount Evelyn, N.T. 1/250,000 Geological series Sheet D 53/5, Australian National Grid
