TENNANT CREEK JOINT VENTURE

ANNUAL REPORT FOR
SEL 8777 "MONUMENT"

FOR THE TWELVE MONTHS TO
15 SEPTEMBER, 1996

Tennant Creek 1:250,000 Series
Sheet SE53-14
Flynn 1:100,000 Series Sheet 5759

Prepared for
Roebuck Resources NL

by

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Technical Report No. 577
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\902\TR 577 K. FOX DECEMBER, 1996
SUMMARY AND CONCLUSIONS

Substitute Exploration Licence (“SEL”) 8777 (“Monument”) is located about 25 kilometres north-northwest of the town of Tennant Creek. The tenement was granted by the Northern Territory Department of Mines and Energy on 16 September, 1994 for a period of three years. This SEL replaced four previous Tennant Creek Joint Venture Exploration Licences (“ELs”) 7407 (“Cleo”), 7446 (“Gecko”), 7469 (“Monument”) and 8244 (“Bishops Bore”).

During the 12 months to 15 September, 1996 exploration was confined to an area known as the Horner Anomalous Zone. This zone as defined by the 25 ppm copper in bedrock contour extends for about 2.7 kilometres to the east-southeast from the general area of the Gecko copper-gold ore deposits and is up to 500 metres wide. It is believed to represent the mineralised extension of the Gecko host shear zone.

The Horner Anomalous Zone was identified by vertical RAB/hammer bedrock geochemical drilling on previous Exploration Licence 7446 in 1991. Its trend length within the Monument SEL is about 2.4 kilometres and within this area, apart from the bedrock geochemical programme exploration has comprised drilling of 58 inclined RAB/hammer holes, five inclined reverse circulation (“RC”) holes and four inclined RC precollared diamond holes.

Prior to 1995 most of the detailed work was confined to a small area 120 metres in trend length - the Horner No. 1 Anomaly. Southerly inclined RAB/hammer drilling over a 240 metres trend length yielded highly encouraging gold, copper and bismuth geochemistry. Deeper southerly inclined RAB holes confined to the eastern 120 metres confirmed continuity of anomalous geochemistry to depth and were followed up by three reverse circulation (“RC”) holes and one RC/diamond hole. These southerly inclined holes encountered encouraging geochemistry.

In early 1995 a detailed data review suggested that the mineralisation dipped steeply to the south-southwest. As a result it was concluded that all previous drill holes were inclined down or at an acute angle to the dip.

In 1995 a northerly inclined RC precollared diamond drill hole GHD 002 was collared to test the most geochemically anomalous section line. This hole deviated and tested the section about 30 metres to the east; nevertheless, a zone of significant disseminated to massive chalcopyrite/pyrite mineralisation was encountered in quartz veined and brecciated chloritised and sheared siltstone between 189.80 and 196.50 metres downhole depth. This 6.70 metres intersection averaged 1.91 percent copper and included 2.4 metres averaging 4.70 percent copper. The hole confirmed that ore grade primary copper mineralisation does occur within the rocks underlying the Horner Anomalous Zone despite the absence of Tennant Creek type ironstones.

Two further RC precollared diamond drill holes GHD 003 and GHD 004 were completed to test the section line 40 metres west of the GHD 002 intersection, but encountered only minor intervals of copper sulphide mineralisation.

After completion of the 1995 programme a further detailed data review resulted in the conclusion that it was essential to more precisely identify the locations of structures which may have produced zones of dilation within the general Horner Anomalous Zone trend before further diamond drilling.

A detailed reinterpretation of ground magnetic data assisted by known geology and geochemistry was completed in early 1996. Targets were identified, but not at a confidence level necessary to justify high cost diamond drilling.

This work was followed up with a detailed gravity survey in the hope that cross cutting structures interpreted from magnetics may be confirmed by gravity trends or lineaments. This was not the case, although some structural insights were gained.
In July 1996 a soil geochemical orientation survey using Mobile Metal Ion ("MMI") geochemistry was completed over the immediate Horner No. 1 Anomaly area. Results suggested that some response was evident in the area vertically above the GHD 002 copper intersection. In September, 1996 additional samples were taken and analysed for MMI to enlarge the area of investigation.

The significance of the MMI results is uncertain.

The copper, cobalt and palladium MMI geochemistry appears to suggest that a north-northeast structural trend may be related to base metal (and possibly also silver) mineralisation. Areas of possibly anomalous gold are not coincident with possible copper anomalies.

Certainly the reliability of MMI geochemistry as an indicator of primary gold and copper mineralisation in the Tennant Creek area remains uncertain; however, the results obtained from the small area sampled to date are of sufficient interest to justify further extension of MMI geochemical sampling to cover the entire Horner Anomalous Zone.
1. INTRODUCTION

Substitute Exploration Licence ("SEL") 877 "Monument" located about 25 kilometres north-northwest of the town of Tennant Creek (Figure 1) was granted to the Tennant Creek Joint Venture by the Northern Territory Department of Mines and Energy on 16 September, 1994 for a period of three years. This tenement replaced four previous Exploration Licences, 7407 "Cleo", 7446 "Gecko", 7469 "Monument" and 8244 "Bishops Bore". At the time of granting the SEL comprised 37 graticular blocks. This was reduced to 19 blocks from 16 September, 1995 and has recently been reduced to 10 blocks for the year commencing 16 September, 1996.

Details of exploration conducted in the various areas surrendered to date have been included in previous reports, all of which are now on open file. This report contains details of exploration during the 12 months period which ended on 15 September 1996 on the ten graticular blocks retained.

The Tennant Creek Joint Venture was formed between Roebuck Resources NL ("Roebuck") and North Flinders Mines Limited ("NFM") in 1991. During 1991 and 1992 Roebuck was operator of the joint venture. Management passed to NFM in early 1993 and it remained as operator until January, 1995. In late 1994 Tennant Creek Holdings NL ("TCH"), a wholly owned subsidiary of Camelot Resources NL, negotiated an agreement whereby it could purchase the majority of NFM's equity. The contributing partners, Roebuck and TCH, agreed that Roebuck should resume management for a period of two years from 1 February, 1995.

Since Roebuck resumed management, exploration on SEL 8777 has been confined to the Horner Anomalous Zone. This is a copper in bedrock geochemical anomaly which extends more than 2.5 kilometres east-southeast from the Gecko Mine area.

2. TENEMENT STATUS

Substitute Exploration Licence 8777 "Monument" covering an initial total area of 37 one minute graticular blocks was granted on 16 September, 1994 for a period of three years. Annual 50 percent reductions of the tenement are required. As of 16 September, 1995 the tenement covered a total area of 19 graticular blocks. A further reduction to 10 blocks occurred from 16 September, 1995 (Figure 2).

3. PREVIOUS EXPLORATION

The results of all exploration completed during the first year of tenure of SEL 8777 were presented in Roebuck's Technical Report No. 516 (see section 7. REFERENCES). The results of Tennant Creek Joint Venture exploration of the tenements converted to the current SEL have been included in various reports which have been previously submitted to the Northern Territory Department of Mines and Energy.

The Horner Anomalous Zone was identified by Roebuck as joint venture manager in 1991 during the early stages of a major bedrock geochemical RAB drilling programme of the area. This programme eventually covered a total area of about 3 square kilometres.

Limited follow-up inclined RAB drilling and a detailed ground magnetic survey were completed by Roebuck in late 1992. More intensive follow up was done by NFM in 1993 and 1994 and again by Roebuck in 1995. To date on SEL 8777 a total of 57 inclined RAB holes have been drilled on 21 section lines. Five RC holes and 4 RC/diamond holes were drilled to more fully investigate targets. Three of these RC holes and all RC/diamond holes were located within a 120 metres strike length of the Horner No. 1 anomaly.
During 1995 limited success was achieved with the drilling of RC/diamond hole GHD 002. This hole intersected significant chalcopyrite/pyrite mineralisation in a quartz veined and brecciated zone between 189.80 and 196.50 metres downhole depth. This 6.7 metres long intersection averaged 1.91 percent copper and included a 2.4 metres long section averaging 4.70 percent copper.

This mineralisation was followed up by the drilling of RC/diamond holes GHD 003 and GHD 004 on the north-south section line 40 metres west of the GHD 002 section. These holes encountered only minor intersections of mineralisation.

4. **EXPLORATION DURING THE PERIOD 16 SEPTEMBER, 1995 TO 15 SEPTEMBER, 1996**

4.1 **GENERAL**

Following the results of the 1995 diamond drilling programme it was concluded that a more precise understanding of geochronology and geological structure is essential to efficient targeting of potential primary mineralisation. No magnetic ironstone bodies occur and mineralisation is expected to be located within haematite rich ironstones or quartz-sulphide breccias of GHD 002 type.

It was considered that detailed interpretation of previously collected ground magnetic data, together with electrical geophysics could assist in target identification.

The proposed 1996 programme was costed on the assumption that such targets would be located and tested by RC and possibly RC/diamond drilling.

The programme completed has comprised: detailed interpretation of the ground magnetic data (see Section 4.2) and a detailed gravity survey (see Section 4.3). This work failed to provide satisfactory target identification and/or definition.

During recent times partial digestion soil geochemistry has become a useful guide to primary mineralisation. Analyses can be done at very low detection limits. One such method is the MMI (Mobile Metal Ion) extraction technique using proprietary leachates supplied by Wamtech Pty Ltd. based in Western Australia. An orientation MMI sampling programme with sample spacing of 40 metres x 40 metres was completed over the Horner No. 1 Anomaly area. Results are discussed in Section 4.4 of this report.

4.2 **INTERPRETATION OF GROUND MAGNETIC SURVEY DATA**

Consultant geophysicist G. Sakalidis was contracted to prepare an interpretation of the ground magnetic data collected by Roebuck in late 1992 and infill survey data collected by NFM in 1993/94. In order to assist this interpretation both lineament data from aerial photography and bedrock geochemical data were supplied.

The resulting interpretation is presented as Figure 3 of this report. Locations of bedrock geochemical anomalies, surface projections of inclined RAB, RC and RC/diamond drill holes and interpreted geochemical target zones have been added to this plan.
4.3 GRAVITY SURVEY

In June and July, 1996 gravity surveys were completed over a number of Tennant Creek Joint Venture project areas. This work was done by Solo Geophysics and Co. and utilised a Lacoste and Romberg gravity meter G556 and a Leica System 200 dual frequency GPS system. Various survey points known to be accurate were used as GPS origins for establishment of control points within the areas surveyed.

The objectives of this work were to locate any near surface (non-magnetic) massive hematite bodies which may exist and to provide better structural control for interpretation of bedrock and downhole geology and geochemistry. The survey covered a total area of about 4 square kilometres.

Profiles were plotted along SSW to NNE traverses 100 metres apart and are presented as Appendix 1 of this report, together with plots in plan and block model form of the total field data.

Subsequently the digital data were provided to Consultant Geophysicist George Sakalidis and a colour residual gravity plan was prepared (Figure 4). No discrete gravity highs were indicated although the gravity trends do offer some insights into Horners Anomalous Zone structure.

4.4 MOBILE METAL IONS (“MMI”) GEOCHEMISTRY

4.4.1 MMI Technology

MMI is a term used to describe metallic ions which have moved in the weathered zone and are only weakly or loosely attached to surface soil particles. MMI Technology is a proprietary sample preparation and analytical technique owned by Wamtech Pty Ltd of Western Australia. The process involves application of MMI digestion liquors which are specifically formulated to extract mobile ions only. Advanced ICP-MS analytical techniques are then used to detect those elements extracted by the appropriate digest liquors.

The current element suite for MMI analysis includes copper, lead, zinc and cadmium using one leachant solution and gold, silver cobalt and palladium using a second solution.

Mobile Metal Ions are believed to be transported from deeply buried ore deposits to the surface. The technique has proved successful in many areas, although some terrains appear unsuitable for this technique.

Samples need to be collected from an appropriate level within the soil profile and during sample collection considerable care needs to be taken to ensure that sampling equipment is non-contaminating and that no jewellery is worn (a stray wedding ring could herald a major drilling programme).

The analytical technique, using sensitive ICPMS instrumentation, is able to detect Mobile Metal Ions in digest solution at ppb levels or less (for gold, silver and palladium). The advantage of the technique is its excellent signal to noise ratio which thus enhances identification of potentially significant anomalies.
4.4.2 MMI Sampling on the Horner Anomalous Zone

In late July, 1996 Roebuck as operator of the Tennant Creek Joint Venture decided to trial MMI sampling over the Horner No. 1 Anomaly where RC/diamond hole GHD 002 drilled in 1995 had intersected potentially significant copper mineralisation with anomalous gold to 0.76 g/t at a vertical depth of about 165 metres. A total of 42 samples were taken at 40 metres intervals along six 240 metres long north-northeast trending grid lines spaced 40 metres apart.

The results of this preliminary orientation survey were plotted by Wamtech Pty Ltd and appear as Appendix II of this report.

In September, 1996 the sample array was extended so that a total area of 400 metres x 400 metres has now been covered with 40 metres x 40 metres sample stations. The results for this second sample phase are included as Appendix III of this report.

Plan presentations of the various metal response ratios (i.e. multiple of background values) appear as Figures 5 to 12.

The location of the mineralisation intersected in GHD 002 is plotted onto Figures 5 and 8 which show response ratios for copper and gold. Figure 5 suggests that copper mineralisation is not extensive and may be related to a north-northeast trending structure. Figures 6 (lead), 7 (cadmium), 8 (gold), 9 (silver) and possibly also 11 (palladium) suggest that the mineralisation encountered in RC/diamond hole GHD 002 may be related to a west-northwest trending zone extending eastwards from the drilled section line.

The best gold response ratios were recorded well to the west and southwest of GHD 002 - see Figure 8. Two of the three elevated response areas are single station features and must be treated with some suspicion until resampled. The third area on the western margin of the sample array is a multiple station feature which needs to be followed up.

It has been recommended that MMI sampled be extended over the whole area of the Horner Anomalous Zone. It should be noted that an area of coincidently anomalous copper and cobalt occurs in the northwest part of the sampled area. It appears possible that both copper rich and gold rich deposits may occur in this area.
5. EXPLORATION EXPENDITURE FOR THE YEAR TO 15 SEPTEMBER, 1996

Expenditure during this year of tenure was less than anticipated because of the decision to postpone deeper drilling until targets were better defined. Expenditures were as follows:

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6. PROPOSED PROGRAMME FOR THE YEAR TO 15 SEPTEMBER, 1997

The objective during 1997 will continue to be identification of areas of potentially significant gold and/or copper-bismuth mineralisation for evaluation by RC and/or RC-diamond drilling. The results of RC-diamond drilling during the last few years have been inconclusive. It is evident that the Horner Anomalous Zone is a significant and large near surface geochemical expression of mineralisation in the underlying rocks, however conventional techniques would require many thousands of metres of RAB/hammer and RC drilling to establish locations of primary zone targets for diamond drilling.

The MMI soil sampling technique appears to offer a possible method for identification of primary sulphide related gold/copper mineralisation at depth at much lower cost.

During 1997 it is proposed that MMI sampling be extended over the whole area of the Horner Anomalous Zone. Sampling is proposed initially at 80 by 80 metres spacings with eventual closure to 40 by 40 metres in areas shown to be prospective. Any targets established would require testing by deep RC and diamond drilling, possibly in 1998.

The MMI programme is estimated to require a total expenditure of about $40,000.
7. REFERENCES

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ROEBUCK RESOURCES N.L.

SEL 6777 - "MONUMENT"
HORNER GRID
Mobile Metal Ion Sampling
Contoured Response Ratios:
Silver

Scale 1:2500