REPORT

ON

JOINT VENTURE PROGRAMME

AT

TENNANT CREEK

NORTHERN TERRITORY

BY

B. Mc. BRIDE

MAY, 1957.
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INTRODUCTION

GENERAL

This report presents the results of a Joint Venture programme carried out in the Tennant Creek Area and in particular the results of a Magnetometer Survey, Geological Survey and Drilling Programme carried out on the Gigantic Leases within A.P. 547 held by United Uranium No Liability.

Mr. Grenning visited the Tennant Creek Gold-Field during October, 1956 and spent some time examining mines and outcrops, studying plans, and gathering information. He was given access to the principal mines. As a result of this visit the Company decided to option the Gigantic, Hopeful Star and Mary Lane Leases. Following this a Magnetometer Survey was carried out on the Gigantic Leases and five (5) anomalies were discovered — 2 major and 3 minor. It was then decided to drill the No. 2 anomaly.

The decision was made to base the scope of the programme on the results of the first drill hole in the Gigantic anomaly. Encouraging results here would have justified further work on the Hopeful Star and Mary Lane Leases.

Mr. Grenning's report on the field dated October, 1956 should be read in conjunction with this one.

SITUATION AND ACCESS (See Plan No. N.355)

Tennant Creek Gold-Field is in the Central portion of the Northern Territory in latitude 19° 33', longitude 134° 15'. Tennant Creek township lies in the centre of the southern half of the field, and is situated on the Stuart Highway 313 miles north of Alice Springs. The Stuart Highway, a first-class bitumen-surfaced road joins Darwin and Alice Springs. The nearest railheads are at Alice Springs, Birdum (307 miles north of Tennant Creek) and Mt. Isa (416 miles east of Tennant Creek and connected with it by the bitumen-surfaced Barkly Highway). Birdum is connected by rail to the Port of Darwin. From these towns mining equipment and food-stuffs are carried by road. A two-runway airport at Tennant Creek is serviced by the Department of Civil Aviation, and T...A... operate passenger, mail, and freight services from Adelaide, Darwin, and Brisbane.

TOPOGRAPHY, CLIMATE AND VEGETATION

The relief of the Tennant Creek district is low, and consists of sub-parallel lines of flat-topped hills rising from an extensive plain, which, at Tennant Creek township, is 1114 feet above sea-level.

Tennant Creek and Phillip Creek are the main drainage channels. Tennant Creek drains the southern, and Phillip Creek the northern part of the area. The creeks are normally dry but consist of a chain of water-holes during and immediately following the "Wet Season" (December - February). There is no permanent surface water, but rock-holes and billabongs hold a moderate supply for short periods after rainfall.
Tennant Creek lies in the semi-arid region of Central Australia and the climate is characterised by long hot summers and short mild winters. Summer temperatures range from 90°F to 115°F and in winter fall as low as 50°F and at times even lower.

Rain falls mostly in the summer months of December and January. The yearly average is 14 inches.

The prevailing wind is a strong south-easterly and blows from May to September.

Plant types include spinifex, mulga, snappy gum etc., a community typical of the arid to semi-arid conditions. A wide variety of flowering plants and shrubs is also found.

**GENERAL GEOLOGY**

J.F. Ivanac has reported on the general geological features of the Tennant Creek Gold-Field, and on the nature of the ore deposits in B.M.R. Bulletin No. 22 issued 1954.

Mr. Gronning's general statement on the geology of the field is taken from Ivanac's report and should be consulted. The stratigraphy of the area is summarised in Table 1 which was drawn up by Ivanac.
### Table 1

**Stratigraphy of the Tenant Creek Gold-Field.**

<table>
<thead>
<tr>
<th>Age</th>
<th>Formation</th>
<th>Lithology</th>
<th>Igneous, Activity, Fossils, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quaternary</td>
<td></td>
<td>Alluvia, re-cemented wash, lalus, laterite.</td>
<td>Erosion and deep weathering.</td>
</tr>
<tr>
<td>Quaternary</td>
<td>UNCONFORMITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>Gum Ridge</td>
<td>Calcareous sandstone, Trilobites, sandy shale,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>chert, brachiopods, sponges, Lyolithids.</td>
<td></td>
</tr>
<tr>
<td>Cambrian</td>
<td>UNCONFORMITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>Helen Springs</td>
<td>Lavas and pyroclastic rocks.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volcanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambrian</td>
<td>UNCONFORMITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>Rising Sun</td>
<td>Conglomerate, sandstone, quartzite.</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>Conglomerate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proterozoic</td>
<td>UNCONFORMITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>Ashburton</td>
<td>Sandstone, Conglomerate, Quartzite, Volcanics.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sandstone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>Warramunga</td>
<td>Sandstone, Luffaceous sandstone, grit, mudstone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>shale.</td>
<td></td>
</tr>
</tbody>
</table>
Ivanac's statements on structure are worth reproducing.

"Detailed structural investigations of the rocks of the Tennant Creek Gold-Field show that there is little possibility of correlating the numerous minor structural features except in a broad and general sense. The sediments are markedly lenticular in character and discontinuous in outcrop, and no suitable marker horizon could be found."

"Bedding planes are generally well defined and range in dip from 30° to 80°. The regional bedding strike is westerly in the southern portion of the field and west-north-west to north-west in the northern portion. A west striking regional fracture cleavage and strongly developed drag-folding have effected bedding over the whole area."

"Faulting has taken place simultaneously with and later than the folding, and consequently two distinct fault groups can be recognised -

(a) east-west trending shears complicated by bedding-plane slips and low thrusts;
(b) quartz-filled faults.

The shears trending east-west are a sequence of disconnected crush zones in which quartz-hematite mineralisation has taken place."

**ECONOMIC GEOLOGY.**

The mineral deposits are classified as:

(a) Copper-Gold and Gold bearing Quartz - Hematite Lodes - at depth
Quartz - Magnetite Lodes;

(b) Auriferous quartz veins - these are unimportant and are disregarded in this report.

The magnetic bodies are undoubtedly of hydrothermal origin and replace "brush Zones" in the Warramunga Group and are confined entirely to this Group. They exhibit transgressive relations with the enclosing sediments and outcrop as east-trending groups of isolated bodies, known locally as "lines", but many isolated bodies are situated some distance from a "line", such as the Gigantic outcrop. The outcrops exhibit all stages of deformations, from those whose upper limit is just exposed to the remnants extending to a depth of a few feet only. It was deduced from this evidence that concealed bodies occur at varying depths and Magnetometer surveys have confirmed this.
GIGANTIC.

LATEST INFORMATION (See plan No. N 359).

Three gold mining leases are held under option —

GML 46E  Gigantic  Area 18.5 acres.
GML 536E  Gigantic No. 2  Area 20 acres.
GML 537E  Gigantic No. 3  Area 20 acres.

Two additional gold mining leases are held by United Uranium W.
Liability —

GML 538E  Gigantic No. 4  Area 20 acres.
GML 539E  Gigantic No. 5  Area 20 acres.

The following mineral leases are held by United Uranium No.
Liability —

ML 113E  Gigantic South  Area 20 acres.
ML 114E  Gigantic North  Area 20 acres.
ML 115E  Gigantic West II  Area 20 acres.
ML 116E  Gigantic West I  Area 20 acres.
ML 117E  Gigantic West III  Area 20 acres.

United Uranium N.L. also holds an authority to Prospect of
approximately 3 2/3 square miles surrounding the leases.

An application for three (3) months exemption from the labour
covenant on all the above leases was recommended by the Warden’s Court on
May 16th, 1957.

GENERAL.

The Gigantic Leases are 19 miles by fire-plough road from Teresa
Creek township in an east-north-easterly direction. Two miles to the south
is the Blue Moon gold-mine. The leases cover an area of more than 200 acres
including a T shaped hill, on GML 46E, with steep slopes on all sides except
to the north-east where the slope is gradual. The mine workings are confined
to the western "arm" of the T shaped hill. A water-course passes 200 - 300 yards to the north of the hill and in this is a lagoon which holds water for several months of the year. This water was utilised for drilling. More permanent water is to be found at "The Pigeon Holes", 3 miles downstream.

MAGNETOMETER SURVEY.

After Mr. Grenning had visited the area and the decision had been made to option the Gigantic leases from a Mr. J. Hall, Surveyor R. Bell proceeded to Tennant Creek on November 20th, 1956 to establish a survey grid at the Gigantic for geological mapping and a Magnetometer Survey. Mr. P. Chessly of Norseman Gold Mines was asked if he assist with the magnetometer work. He sent a geologist (R. Haines) and a magnetometer to Tennant Creek on December 1st, 1956 for the purpose of carrying out the magnetometer survey of the Gigantic.

Five anomalies were discovered - two major and three minor. (See Report on Variometer Survey of Gigantic Leases, Tennant Creek by R. Haines - Appendix 1)

ANOMALIES (See plan No. N287)

Results of the survey revealed the No. 1 anomaly of about 500 gammas centered at 1090N/2420W. The site of the anomaly is on the "bull-dust" plain approximately 100 feet north-west of the nearest quartz-hematite outcrop. Haines interpreted this anomaly as being due to a moderately deep seated (350 - 400 feet) lenticular body of relatively small size with a strike length of roughly 100 feet.

Anomalies Nos. 3 and 4 are interpreted as being due to small spherical bodies situated at depths of roughly 300 feet. The No. 3 anomaly is alongside a small quartz-hematite outcrop at 0/1100W while the No. 4 anomaly is centered on the south-western slope of the Gigantic hill.

The No. 2 anomaly of about 3500 gammas is of major dimensions and is centered at 320 N/1600W alongside a quartz-hematite outcrop on the bull dust plain. Haines interpreted this anomaly as indicating "a large lenticular to tabular body with a strike length of some 400 feet which outcrops (completely leached) and which is continuous to a depth of 700 feet or more." This anomaly is one of the largest yet encountered in the Tennant Creek area. It promised to be important in so far as it pointed to the existence of a large body of magnetite beneath and slightly to the south-west of an outcrop. Many of the Tennant Creek outcrops are not deep seated but the magnetic survey indicated that the Gigantic hematite outcrop had deep roots.

The No. 5 anomaly is centered at 250S/200E and amounts to 2000 gammas. It is apparently due to a lens of quartz-magnetite centered about 350 feet from the surface with an almost vertical dip and pitching to the south east.

These five anomalies indicate a hitherto unknown and unexplored line of hematite bodies at depth.
The field books of the survey are not available at present and so an analysis of operations cannot be given in this report. Traverses were in a north-south direction at 300 feet intervals with stations every 100 feet. After the survey it was recommended that a higher density of stations be used in the vicinity of the discovered anomalies to obtain a more detailed picture. Unfortunately this was not carried out.

The survey indicated a north-west south-easterly line of quartz-hematite bodies at depth and dipping to the south-west.

A large number of the outcropping "ironstone" bodies are apparently barren, and the proportion of auriferous to non-auriferous bodies is considered to be between 1 to 5 and 1 to 10. This suggests that, with few exceptions, individual ones at depth are not likely to provide large tonnages of payable grade ore. The chances of finding copper ore associated with quartz-magnetite were somewhat slender but this sort of gamble is being accepted on the field in commencing a drilling programme and we decided to follow suit. National Lead are trying to improve the odds by combining geochemical prospecting with their magnetic prospecting. So far the evidence in support of geochemical prospecting in the Tennant Creek area is inconclusive.

DIAMOND DRILLING.

In his report Mr. Grenning stated that the prospect was worthy of 4000 feet of drilling and a programme was drawn up. Due to unforeseen weather the drilling was held up until the end of January, 1957 when the site for the Gigantic Surface D.D.H. No. 1 was decided on.

Drilling began during the first week of February and the hole was stopped at 621 feet on May 15th, 1957. This is an extremely poor footage for the period of operation of the drill and was mainly due to bad ground - as evidenced by the many lost holes in the district. There was a long period of no progress at 270 feet before the hole was reduced in size to EX. We were reluctant to reduce the core size from AX to EX. However, when the decision was made to reduce the hole the drilling progressed much more satisfactorily. It is recommended that if further drilling be done in the district copious cementing be carried out.

In the Tennant Creek area water is one of the main drilling troubles. Fortunately the drill site was only about 2000 feet from a lagoon and this outlasted the hole. It is recommended, that in future when drilling in remote areas where water is scarce, to ask the drilling company to submit a price per foot which is inclusive of water charges.

Details of the drill hole are given later.

GENERAL GEOLOGY (See Plan Nos. N375; N376; N377)

The hill, which is the most prominent feature of the area, is composed of massive quartz-hematite, unaltered sediments, and brecciated and hematite-impregnated sediments. The high points of the hill are generally of massive quartz-hematite.
Massive quartzitic sandstone, tuffaceous sandstone, fine-grained sandstone, sandy claystone, sandy shale, and mudstone are the main rocks on the leases. Rock outcrop occupies a minor portion of the leases, the major portion being concealed by drift.

The rocks, due to oxidation, are all yellowish or reddish in colour at the surface and at depth the colour varies from green to black, the latter possibly due to the presence of graphite. Lighter coloured schists, some of which are practically white, are talcose or Sericitic.

**ECONOMIC GEOLOGY.**

There are several massive quartz-hematite bodies on the leases, practically all of these being found on GNL 46E and GNL 53E. The bodies are interconnected by hematite-rich sediments. It will be seen that the long axis of the bodies lie in two general directions on bearings of 60° and 300°.

The quartz-hematite is hard, lustrous, and blue-black to black, and variations in quartz content and grain size within the bodies are apparent. Quartz content increases from west to east from about 5 percent to about 35 percent. Grain size varies from fine to very coarse. Evidence of shearing can be found in practically all the bodies. These quartz-hematite bodies are in part replacement bodies and in part intrusives. Hence their boundaries vary from well defined to gradational, giving way to hematite-rich sediments, particularly in crush zones.

Up to September, 1950 a total of 1124.35 long tons of ore had been treated averaging 9.1 dwt gold per ton with a tailing of 6.3 dwts.

No evidence of copper mineralisation was found on the surface.

**STRUCTURAL CONTROL.**

According to Ivenac the lodes occur on the south limb of an east-plunging anticline, in a zone of marked pitch change. Considerable faulting is associated with the folding and ore shoots are localised where shear zones intersect favourable siltstone and mudstone horizons.

There appears to be a major crush zone striking east-west, with minor faults striking off at various angles. This major crush zone approximates very closely to the anomaly "line". Possibly the ore-bodies have been localised at the intersections of minor faults with the main east-west crush zone, which is strongly brecciated.

**DIAMOND DRILLING RESULTS.**

As stated before diamond drilling was confined to the No. 2 anomaly discovered by the survey.

**GIGANTIC SURFACE D.D.H. No. 1**

A cross section of the hole is shown on Plan No. N357.
Coordinates: 13N/1736W.
Reduced Level: 919.7 feet.
Inclination: 53°
Bearing: 43° Magnetic.
Size of Core:
- BX: 0 - 136 feet.
- EX: 276 - 621 feet.
Total Core Recovered: 391\(\frac{1}{4}\) (63.04%) Core below 105 feet: 391\(\frac{1}{4}\) (75.37%)

Of the aggregate amount of drilling 133 feet was in ironstone of various types, and the remaining 468 feet in shale and siltstone for the most part. The ironstone gave good drilling and progress in it was very good. The shales gave relatively good drilling but the "bull dust" and two bands of unconsolidated material in the shales were the cause of most of the delays.

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Footage</th>
<th>Core Recovery</th>
<th>Description of Core etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>105</td>
<td>105</td>
<td>--</td>
<td>Bulldust. Contains quite a high percentage of biotite below 30 feet. Some vermiculite present also.</td>
</tr>
<tr>
<td>105</td>
<td>125</td>
<td>20</td>
<td>10'</td>
<td>A biotite rich metamorphic rock. Coarse grained and friable exhibiting a granoblastic texture. Sheared in places.</td>
</tr>
<tr>
<td>170</td>
<td>185</td>
<td>15</td>
<td>1(\frac{1}{4})'</td>
<td>Massive indurated siltstone. Brownish coloured. Greenish chloritic shale. Ironstained and sheared. Minor bands of fine grained sandstone at 214'. Ironstone with minor shale bands. Banding almost parallel to axis of core. Sheared in places. No core. Mud sludge. This zone was the cause of most of the trouble due to caving. The AX casing could not be reamed through the overlying band of ironstone.</td>
</tr>
<tr>
<td>185</td>
<td>190</td>
<td>5</td>
<td>2(\frac{1}{2})'</td>
<td>Ironstone with minor shale bands. Banding almost parallel to axis of core. Sheared in places.</td>
</tr>
<tr>
<td>190</td>
<td>215</td>
<td>25</td>
<td>11</td>
<td>Banded ferruginous shales. Banding parallel to the axis of the core.</td>
</tr>
<tr>
<td>233</td>
<td>244</td>
<td>11</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>244</td>
<td>254</td>
<td>10</td>
<td>6'</td>
<td></td>
</tr>
<tr>
<td>254</td>
<td>265</td>
<td>11</td>
<td>7'</td>
<td></td>
</tr>
<tr>
<td>From</td>
<td>To</td>
<td>Footage</td>
<td>Core Recovery</td>
<td>Description of Core etc.</td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td>---------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>265</td>
<td>380</td>
<td>115</td>
<td>113'</td>
<td>&quot;Ironstone Lode&quot;. Quartz-hematite for the most part but in places quartz-magnetite. This seems to be the extension of the outcrop and the cause of the anomaly. Contains slight disseminated sulphides mainly chalcopyrite and usually in association with quartz bands. Of no economic significance.</td>
</tr>
<tr>
<td>380</td>
<td>621</td>
<td>241</td>
<td>225½'</td>
<td>Green to black shales. Bedding at 60° to axis of core. Sparse pyritic mineralisation on joint planes.</td>
</tr>
</tbody>
</table>

It is considered that the hematite lode intersected from 255 to 380 feet is the downward extension of the outcropping quartz-hematite. Some of the core was highly magnetic (strongly deflected a compass) and showed polarity. This indicated that the body intersected was probably the cause of the anomaly discovered in the magnetometer survey. As is the case elsewhere at Tennant Creek the anomaly caused by the magnetic body is not directly above the latter at the surface but is displaced to the north. This effect is general in the field and the amount of displacement is a function of the angle of inclination of the earth's magnetic field and the depth of the body among other factors.

When the anomalies were discovered it was thought that the longest, which had an intensity almost as high as that of the Peko No. 1 anomaly, might represent a magnetic lode with copper mineralisation at depth as at Peko. There was no guarantee that this relation existed but the gamble was thought worth-while. Since then other Companies have drilled anomalies in the field without discovering an ore-body and this in conjunction with the low price of copper at present makes it realised that drilling anomalies on the Tennant Creek field is very costly with only a very slight chance of success.

Peko Mines and National Lead Co. of U.S.... are carrying out widespread investigations and have between them the more likely areas. They are also making extensive preparations to receive the results of the B.M.R. Airborn magnetic survey expected to be made public in August.

HOPEFUL STAR.
(See plans Nos. N353; N344; N345)

LEASE INFORMATION.

Three mineral leases are held under option —

| ML 61E | Hopeful Star | Area 20 acres. |
| ML 62E | Hopeful Star C | Area 20 acres. |
| ML 63E | Hopeful Star B | Area 20 acres. |
An application for three (3) months exemption from the labour covenant on these leases was recommended by the Warden's Court on May 15th, 1957.

GENERAL.

These leases are situated 10.5 miles north-east of the township approximately 1 mile east of the road to the Gigantic.

The Hopeful Star hill forms a prominent residual feature with steep sides and flat top. Abundant ironstone talus occurs on the slopes, and a small body of dense ironstone outcrops on top. The hill consists principally of crush rock strongly hematized.

Mining has been by open-cut on the eastern end of the hill and an adit from the south side passes almost through the hill. Prospectors sunk two shafts out on the flat some 200 yards from the hill and Mr. Grenning, on hearing that good gold values were found in one of the shafts, obtained an option over the three leases in the hope of a quick return.

The shafts were examined and the workings sampled. (See plans Nos. M344, M345) The west stope floor samples at 47' depth 15.0 dw t / 60" and 6.4 dw t / 36" averaging 12 dw ts over 5 feet width and were encouraging as also is the assay of 13.0 dw t over 5 feet width in the east stope at 49' depth.

In 1937 the A.G.A.S.N.A. discovered small anomalies in the vicinity of outcropping ironstone or ironstone talus on the hill. From this it was concluded that no large body of ironstone was present and that the hill was the remnant of an ironstone body almost completely denuded.

In view of the failure of the Gigantic drill hole to discover ore the General Manager decided it was not worth while following up the gold values discovered particularly as most gold mines are squibs.

MAY LANE.

LEASE INFORMATION (See plan No. M374).

Three gold mining leases are held under option —

GML 44E Mary Lane Area 5 acres.
GML 166E Mary Lane West Area 10 acres.
GML 167E Mary Lane East Area 10 acres.

The following mineral leases are held by United Uranium No Liability —

B 105E Mary Lane South Area 80.7' x 100'.
Application for ML 113E was recommended by the Warden's Court on May 14th, 1957.

An application for three (3) months exemption from the labour covenant on the above leases, with the exception of ML 113E, was recommended by the Warden's Court on May 15th, 1957.

GENERAL.

The area is situated 5 miles north-west of the township and 2 miles south of the main granite outcrop. Small ironstone bodies occur along a general east-west "line".

A major type anomaly was discovered by the A.G.C.S.M.A. in 1937. Two minor anomalies were also discovered.

This major anomaly was apparently due to a small body of ironstone at a shallow depth beneath the outcropping body. The two minor anomalies were interpreted as being due to small bodies at depths of approximately 300 feet.

One of the main points of interest in this area is the presence of secondary copper minerals in black shales outcropping in ML 113E. No copper mineralisation was found in the outcropping hematite bodies.

CONCLUSIONS.

Geological knowledge of Tennant Creek Gold-field is not yet complete in respect of factors controlling the deposition of gold and copper, and the location of the ore bodies. Whatever the actual part played by the ironstone lenses in the deposition of gold and copper it is established that the ironstone bodies or formations adjacent to them contain the principal ore bodies. However, it is important to note that the deposits are normally small and generally very irregular. They are comparatively hard targets for drilling, and have been shown to be discontinuous in every dimension.

Some scope exists for the search for copper-gold ore of the Peko Type. The hematite outcrop at Peko did not give much evidence of the existence of high grade copper ore below, and other non-outcropping copper deposits could exist in the district. But there is as yet no evidence that large copper deposits occur at Tennant Creek.

In their search for these possible copper ore-bodies Peko Mines and National Lead Co. of U.S.A. are concentrating on geophysical work and the anomalies discovered thereby. They are also making extensive preparations to receive the results of the B.M.R. airborn magnetic survey. However, it must be remembered that magnetic prospecting locates an anomalous area which is
interpreted to be a quartz-hematite body at a certain depth. Whether economic ore is associated with such a body is not known. If a major anomaly is in a favourable locality — along or near a "line" — it is worthy of being drilled. In this way most of the major anomalies on the field have been drilled or are now in the process of being drilled. So far the only known economic copper ore body on the field is Peck and it is thought that the chances of discovering another such body are not good.

Geochemistry is being used in conjunction with the magnetometer as a tool in the search for ore bodies in the Tennant Creek area. In endeavouring to determine its efficiency National Lead Co. are going to considerable expense but as yet the evidence is inconclusive.

If, in the future, any interesting developments take place on the Tennant Creek field the Company, in the light of past experience, could act quickly in evaluating any evidence brought forward.
BIBLIOGRAPHY.

GRENNING, P.J., 1956 — Report on Tennant Creek Mining Field.


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NYE, P.B. )

APPENDIX.

REPORT ON

VARIOmeter Survey

Gigantic Leases

Tennant Creek

United Uranium No Liability

REPORT ON

VARIOMETER SURVEY OF GIGANTIC LENSES

TENNANT CREEK

GENERAL.

The survey was highly successful and gave rise to the discovery of 5 anomalous centres, one of which would appear to be of major significance, the largest yet discovered in the field, the other four, whilst still of significance are of a minor nature when compared with the former.

The area is ideal for rapid variometer surveying though the climate at this time of the year is not conducive to prolonged intensive field work.

No work was undertaken outside that shown on the map, mainly because the records of the warden's office are such that it would take several days search to ascertain if a particular area was held or open-time for such a search, unfortunately, was not available. However I would definitely suggest that if further magnetometer work, of a regional nature, is contemplated then the area between Peko, Nobles Nob and Elderado -- if open -- should be made the initial target area.

I would like to thank P. Grenning and R. Bell whose willing and competent help made the survey a relatively simple and speedy matter.

GENERAL STRUCTURE

The general structural control of the area appears to be a left hand echelon arrangement of bodies formed by a series of shear link fractures.

The bodies are probably located on the south limb of an anticline (as is the case at Gigantic), the fracturing of which possibly being caused by a cross fold. This would then explain the apparent pitch change from south west in Anomaly No. 2 to south east in Anomaly No. 5.

The centres of each of these bodies are remarkably equidistant from each other, the distance being 600 ft. ± 50 ft., with the exception of Anomaly No. 1, which does not appear to be controlled by the same set of conditions as are Anomalies 2, 3, 4, and 5.

Shape, Size and Depth of bodies giving rise to anomalies:

ANOMALY NO. 1.

Moderately deep seated (350 ft. to 450 ft.) lenticular body of relatively small size, strike length roughly 100 ft.
ANOMALY NO. 2.

Large lenticular to tabular body with a strike length of some 400 ft. which outcrops (completely bleached) and is continuous to a depth of 700 ft. or more.

The dip of this body is almost vertical, but may be slightly south (95°). The pitch is also almost vertical with a possible tendency to be steep to the south west.

A magnetic profile across this body (fig. 5) shows a major positive anomaly 3600 gamma's above the general base level immediately besides a major negative anomaly which was well beyond the range of the instrument (less 15,000 gamma's) which has arbitrarily been given a value of greater than 13000 gamma's but is in reality many times greater than this figure.

The reason for this rapid reversal of polarity is considered to be due to the effect of weathering above the water table - thus it is considered that the negative polarity in Anomaly No. 4 is due to the fact that the body giving rise to this anomaly is situated entirely in the oxide zone (see later) whilst with Anomaly No. 2 both the oxide and the sulphide zones are represented and as the dip is very steep the influence of the oxide and sulphide zones (negative and positive anomalies respectively) are seen to be side by side, the fact that the positive influence is very much more wide spread that the negative indicates that the greater mass of the body lies in the sulphide zone.

Nothing definite can be said of the economic possibilities of the body but it is heartening to remember that the greatest anomaly previously discovered in the field is now the operating mine of Peko.

This anomaly (5500 gamma's) has been shown, both by drilling and underground development, to be caused by a body which is situated below the water table and hence no major reversal of polarity is evident here. See J.F. Ivanac's report Plate No. 27.

One suggested position for a diamond drill hole has been laid out to test the economic possibilities of this body. This hole has been designed on maxima - minima projection and covers a 60°E x 60°W pitch and a 10°N x 10°S dip - it is considered that this gives a safe coverage of the body's behaviour and attitude in depth.

ANOMALY NO. 3.

A very small spherical body situated at a depth of probably about 300 ft + main significance is its position in the echelon pattern.

ANOMALY NO. 4.

Corresponds very neatly with a down dip repetition of the original Gigantic, indicates the same general spherical shape of the Gigantic but would appear to be a good deal larger - based on absence of significant anomalous results above the Gigantic itself. Looks similar to anomalous conditions at Peko but considerably smaller scale.
ANOMALY NO. 5.

A lenticular to tabular body, strike length 150 - 200 ft. centre situated at about 300 ft. to 400 ft. dip almost vertical and pitching to the south east.

This is the second largest body in the area and if an economic win is made on Anomaly No. 2 then this could be drilled with confidence.

R.W. H. INES

Norseman, W....

December, 1956.
Former GML 793
Section 511
30.5 Ac.
"HOPEFUL STAR"

Former GML 794
13.2 Ac.

REVISIONS

UNITED URANIUM N.L.
GOVERNMENT SURVEY PLAN
HOPEFUL STAR LEASES
TENNANT CREEK AREA

Scale: 1" = 40'

Drawn: WMW. Date: 4-6-57 App'd:

FILE N°
10 B

DRG N°
N358
AP. 547

3.4 sq. miles (approx.)

UNITED URANIUM N.L.

LEASE PLAN AP. 547
WARRAMUNGA GOLDFIELD
TENNANT CREEK AREA

Scale 1" = 1/4 mile

Drawn: WMW  Date: 3-6-57  App'd:

FILE NO. 10 B

DRG NO. N359