NORTHERN TERRITORY GEOLOGICAL SURVEY REPT. GS79/8

DIAMOND DRILLING INVESTIGATIONS, 1978

UNION EXTENDED GOLD MINE, N.T.

by

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CONTENTS

1. SUMMARY

Following an application for drilling assistance at the Union Extended Gold Mine in December 1977, the Drilling Section, Department of Mines and Energy, drilled three diamond drill holes, totalling 270 metres, between September and October 1978.

The diamond drilling programme was designed to test the depth extent of a gold-bearing, quartz lode system below a sizeable, abandoned open pit mine and any extensions of the lode system along strike to the north and south of the open pit. Production in excess of 5000 ozs. of gold was recorded from the open pit and environs between 1875 and 1908.

Some narrow quartz lode intersections were encountered in drill holes but no significant gold assays were obtained indicating that gold mineralisation does not persist at depth.

As the mine workings investigated were the most significant in the mine area, further drilling investigations of lesser workings are not warranted in view of the poor results obtained from the 1978 drilling programme.

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2. INTRODUCTION

An application for drilling assistance at GML's 144-147A was made by the leaseholder Ian Genat in December 1977. A drilling programme of up to 400 metres was subsequently approved. Diamond drilling was carried out during September and October 1978 and consisted of three holes totalling 270 metres.

Prior to the commencement of the drilling programme plane table mapping of abandoned mine workings and environs was undertaken by officers of the Northern Territory Geological Survey.

3. LOCATION AND ACCESS

Map: Pine Creek 1:100,000 Topographic Survey Sheet 5270

Co-ordinates: Lat. 13° 37' 30"

Long. 131° 46' 20"

Universal Grid Reference: HL000920

Vehicle access from Darwin is by the Stuart Highway to the Fountainhead turn-off then by gravel road to Burrundie Siding. Heading south along the gravel Burrundie - Pine Creek road the mine turn-off to the east of the road is 12.5 kilometres from Burrundie Siding. A rough track from the turn-off reaches the mine area after about 3 kilometres. The McKinley River Crossing makes the rough track impassable

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for much of the "wet season" while flooded creeks may make the gravel roads impassable for short periods.

4. HISTORY

Gold was first discovered on a hill to the west of the river (McKinlay?) by Starke and party in 1875. A first crushing of picked stone yielded 685 ozs. from seven tons of stone and up to July 1876 a total of over 2000 ozs. of gold was won from the mine. Due to disagreements between the lease holders the mine was then abandoned for 18 months.

In January 1879 a second party was formed to re-open the mine and a five-head battery was erected. From January, 1879 to September, 1881 2300 ozs. of gold was obtained from the mine. At about this time water problems were encountered as mine workings deepened and records of subsequent mining are sketchy.

The mine was sold in 1884 and worked intermittently to July, 1891 when there was a heavy fall of stone.

In 1892 the then leaseholder, Mr. H. Roberts is said to have found a 4 metre leader from which a crushing of 320 ozs. of gold from 105 tons was obtained. Mr. Roberts had a 10-head battery erected which commenced operations in November 1892. From this time the mine was worked by Chinese tributers for an unspecified period.

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Total recorded gold production from the mine is in excess of 5000 ozs.

5. GEOLOGY

The geology of the mine area consists of sheared shales and silstones of the Lower Proterozoic Burrell Creek Formation with numerous outcrops of intrusive basalt and dolerite. The sediments generally strike in a north to north-westerly direction and dip steeply to the west.

Old workings are generally concentrated in outcrops of sheared shale but due to in-filling of workings the nature of the lode systems has been obscured. Within the open pit (plate 2) at least two quartz-rich bodies up to 2 metres wide and striking in a northerly direction are observed but it is not known whether these bodies were worked for gold. Considering the position of the old workings only, a north to north-north-west strike direction of the lode systems is indicated.

Records of the lode systems are variable and sketchy but generally concur that the lodes consisted of numerous irregular quartz stringers within sandstone or shale. The quartz stringers were generally only a few centimeters thick but there are reports of some quartz reefs up to five metres wide. Such wider quartz reefs were of a discontinous nature with very limited strike length.

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"Some very rich concentrations of secondary gold were associated with irregular bands of dolomite, probably representing zones of replacement in the sheared sedimentary rocks" (Walpole et al, 1968).

6. DIAMOND DRILLING RESULTS

Three diamond drill holes totalling 270 metres were completed by the Department's Drilling Section. Core recovery was effectively 100% in all holes. All drill core was geologically logged and 55 split core samples were forwarded to the East Point Laboratories, Department of Transport and Works for assay. The samples were assayed for gold, silver and bismuth.

D.D.H. 1 was depressed 45° on a bearing of 60° magnetic and was designed to test whether gold mineralisation persisted at depth below an area of numerous pits and shafts some 75 metres north-west of the open pit (plate 2). The hole intersected interbedded slate and greywacke throughout. Numerous narrow quartz stringers were encountered and two quartz vein systems of note were intersected between 81.0 and 81.9 metres and between 94.6 and 95.6 metres. Both vein systems consisted of numerous quartz stringers with interbands of slate, the quartz contained minor pyrite. Only one gold assay above the detection limit was noted, this was in the vein system

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between 81.0 and 81.9 metres where an assay of 3.5 gm/tonne was recorded over the interval 81.4 to 81.9 metres.

D.D.H. 2 was depressed 50° on a bearing of 60° magnetic and was designed to test whether gold mineralisation continues at depth below the open pit. Silstone was the main rock type intersected with lesser interbeds of slate and greywacke. An altered basalt sill was intersected between 56.4 and 63.0 metres. The basalt was commonly veined with carbonate material with minor pyrite and chalcopyrite associated with some of the carbonate veining. A system of narrow quartz veins was intersected between 32.0 and 32.5 metres. All gold assay results for this drill hole were below the detection limit of 0.2 gm/tonne.

D.D.H. 3 was depressed 45° on a bearing of 70° magnetic. The hole was sited about 110 metres south of the open pit and was designed to intersect any southern extension of gold mineralisation inferred by the general attitude of the workings to the north of the open pit. The hole intersected interbedded chloritic slates and greywackes with two narrow bands of altered igneous material between 9.9 and 11.2 metres and between 53.5 and 57.2 metres. The interval 69.0 - 80.5 metres may represent a broad complex lode system. In the interval there are many quartz stringers containing pyrite, galena and some sphalerite as well some sections of sediment contain sulphide material as blebs or veinlets. However all gold assay results for this drill hole were below the detection limit.

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7. CONCLUSIONS AND RECOMMENDATIONS

The diamond drilling programme has not detected any significant gold mineralisation at depth below the old workings. The holes intersected both broad and narrow complex quartz lode systems as well as some carbonate-rich sections but in all but one instance no gold was associated with these intersections.

It is concluded that either no gold mineralisation occurs at depth below the old workings or more probably because of the patchy nature of the complex lode system (described when the mine was operational), the possibility of a diamond drill hole intersecting a patch of enriched gold mineralisation is remote.

As a result of poor drilling results and the patchy nature of the lode system no further diamond drilling is recommended at this time. Any further investigation should be in the form of exploratory mining and detailed mapping with the object of locating a further enriched zone of gold mineralisation. Such a programme would however, require a considerable amount of both capital and labour (as evidenced by past operations at the mine) with no guarantee that further economic gold mineralisation would discovered.

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8. REFERENCES

Balfour, I.S. (ed.) 1978 Extracts from the Administrators and Director of Mines Reports Darwin - Katherine Region. GS78/15 (unpubl.)

Balfour, I.S. (ed.) 1979 Extracts from the N.T. Times and Gazette. From 1873 (unpubl.)

Walpole, B.P., Crohn, P.W., Dunn, P.R. and Randal, M.A. 1968 Geology of the Katherine - Darwin Region, Northern Territory. Bur. Min. Resour. Aust. Bull. 82.

APPENDIX I

DIAMOND DRILL HOLE ASSAYS

UNION EXTENDED GOLD MINE N.T.

Split core samples were analysed using the Atomic Absorption Spectrophotometer at the East Point Laboratory, Department of Transport and Works. Results are given in either grams per tonne or micrograms per gram.

Detection limits are as follows:

Au	0.2	gm./tonne
Ag	1 or 2	gm./tonne
Bi	10	ug/g

A minus sign (-) preceding a number indicates the value is less than the detection limit.

UNION EXTENDED GOLD MINE N.T.

Drill Hole	Interval (Metres)	Au (gm/tonne)	Ag (gm/tonne)	Bi (ug/g)
D.D.H. 1	22.7 - 23.4	- 0.2	1	25
	24.9 - 25.4	- 0.2	3	20
	39.0 - 39.6	- 0.2	1	20
	41.25 - 41.75	- 0.2	1	25
	41.75 - 42.4	- 0.2	1	25
	43.85 - 44.3	- 0.2	1	18
	67.75 - 68.25	- 0.2	1	20
	73.0 - 73.5	- 0.2	2	14
	81.0 - 81.4	- 0.2	1	16
	81.4 - 81.9	3.5	2	25
	94.2 - 94.9	- 0.2	1	25
	94.9 - 95.6	- 0.2	1	14
D.D.H. 2	32.0 - 32.5	- 0.2	2	25
	39.4 - 39.9	- 0.2	2	25
	47.0 - 47.5	- 0.2	1	18
	56.5 - 56.6	- 0.2	1	30
	58.3 - 58.4	- 0.2	1	25
	58.6 - 58.7	- 0.2	1	25
	59.6 - 59.7	- 0.2	1	25
	60.2 - 60.3	- 0.2	1	25
	60.7 - 61.1	- 0.2	4	40
	61.75 - 61.85	- 0.2	1	14
	62.3 - 62.4	- 0.2	2	25

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Drill Hole	Interval (Metres)	Au (gm/tonne)	Ag (gm/tonne)	Bi (ug/g)
D.D.H. 3	54.5 - 55.0	- 0.2	2	40
	56.7 - 57.2	- 0.2	2	50
	57.9 - 58.4	- 0.2	2	30
	59.7 - 60.2	- 0.2	- 2	25
	61.1 - 61.6	- 0.2	- 2	20
	61.9 - 62.4	- 0.2	- 2	16
	66.6 - 67.1	- 0.2	- 2	20
	69.0 - 69.5	- 0.2	6	30
	69.5 - 70.0	- 0.2	- 2	20
	70.0 - 70.5	- 0.2	2	30
	70.5 - 71.0	- 0.2	- 2	18
	71.0 - 71.5	- 0.2	2	30
	71.5 - 72.0	- 0.2	- 2	20
	72.0 - 72.5	- 0.2	4	30
	72.5 - 73.0	- 0.2	14	60
	73.0 - 73.5	- 0.2	2	30
	73.5 - 74.0	- 0.2	- 2	16
	74.0 - 74.5	- 0.2	- 2	25
	74.5 - 75.0	- 0.2	- 2	25
	75.0 - 75.5	- 0.2	- 2	25
	75.5 - 76.0	- 0.2	- 2	20
	76.0 - 76.5	- 0.2	4	25
	76.5 - 77.0	- 0.2	2	25
	77.0 - 77.5	- 0.2	- 2	20
	77.5 - 78.0	- 0.2	- 2	16
	78.0 - 78.5	- 0.2	- 2	16
	78.5 - 79.0	- 0.2	- 2	20
	79.0 - 79.5	- 0.2	- 2	20
	79.5 - 80.0	- 0.2	- 2	20
	80.0 - 80.5	- 0.2	2	16
	94.0 - 94.5	- 0.2	4	25
	94.5 - 95.0	- 0.2	2	18

APPENDIX II

Geological Drill Log Summaries

Union Extended Gold Mine N.T.

D.D.H.'s 1 - 3

UNION EXTENDED D.D.H. 1

INTERVAL (metres)	
0- 4	Fawn claystone, broken and friable.
4- 10	Fawn interbedded siltstone, greywacke and slate, oxidised and broken, some sections are highly friable.
10- 94.6	Interbedded grey-black slate and grey greywacke, bedding approximately 55° to drill hole direction, some moderately fractured sections. Bands of coarse lithic sandstone between 22.7 and 23.5m and 39 and 39.6m. Minor quartz veins between 5 and 10cm. thick, some with some pyrite and/or chlorite at 24.0, 24.25, 26.60,and, 33.9m, 53.5, 57.0m, 68.2 and 73.3, 25.0-25.4m. Quartz vein with galena and sphalerite 41.25-41.75m. Carbonate - rich section. 41.75-42.4m. Very coarse greywacke with some pyrite along fractures. 43.85-44.3m. Section with several quartz veins. 81.0-81.9m. Quartz vein system with interbands of sediments, quartz contains chlorite and minor pyrite.
94.6- 95.6	Quartz vein system with interbands of sediments, minor pyrite.
95.6-102.6	Interbedded grey-black slate and grey greywacke 97.8m. Quartz vein with pyrite 3cm. thick. Some narrow carbonate veinlets less than 1cm. thick below 100m.

UNION EXTENDED D.D.H. 2

INTERVAL (metres)	
0-3	No core recovery.
3-18.5	Fawn siltstone and sandstone, oxidised, some sections broken and friable. Some narrow bands of grey slate. 10.3-10.45m. Series of narrow quartz veins. 13.4m. Minor quartz veining about 3cm. thick.
18.5-56.4	Mid grey siltstone with some interbeds of slate and greywacke. Bedding approximately 50° to drill hole direction. Siltstone is partly silicified to about 30m. and partly chloritised below this depth. 32-32.5m. System of narrow quartz veins. 39.4-39.9m. Several narrow carbonate veins, less than 1cm. thick, in chloritic slate, some pyrite associated with the carbonate. 47.25m, Quartz vein with pyrite about 2cm. thick. A few narrow carbonate veins below 50.5m.
56.4-63.0	Black fine-grained igneous rock, altered basalt with, many narrow carbonate veins some with associated pyrite and chalcopyrite. 612.-61.95 Altered sediments?
63.0-63.3	Dark grey hornfels (contact metamorphic rock)
63.3-71.4	Grey siltstone with interbeds of slate and greywacke, with a few carbonate veins with minor pyrite. 66.4-66.7m. Band of coarse greywacke.

UNION EXTENDED D.D.H. 3

INTERVAL (metres)	
0-2.8	Red-brown silt.
2.8-9.9	Green-brown, highly altered, oxidised, basic intrusive rock, mottled with white specks of chlorite?
9.9-11.2	Green-brown medium-grained basic intrusive rock, highly altered and oxidised.
11.2-26.8	Grey interbedded chloritic slates and greywacke-siltstones. Moderately oxidised and fractured to about 14m. Below this depth there is a gradual decrease in the level of oxidation.
26.8-28.55	Black medium to fine grained igneous rock, altered basalt. Some disseminated pyrite.
28.55-40.45	Dark grey argillaceous sandstone with minor pyrite.
40.45-41.75	Greywacke with narrow bands of slate.
41.75-53.5	Dark grey chloritic slate 42.2-42.3m. Narrow carbonate band with some chlorite 47.9m. Carbonate band with chlorite, 5cm. thick. 53.4m. Quartz vein with chlorite, 2cm. thick. Very fine pyrite veins 1mm. thick near contact at 53.5m.
53.5 -57.2	Dark grey altered carbonate-rich igneous rock, altered andesite/meta-diorite, minor pyrite, much biotite and chlorite. Much carbonate veining. Some pyrite-rich sections.
57.2 -96.4	Grey interbedded greywacke-siltstones and chloritic slates. Many narrow quartz veins less than 1cm. thick in interval 58.05-58.4m. 59.9-60.2m. Quartz vein with chlorite, minor pyrite. 61.25-61.45m. As above. 61.45-61.6m. A few coarse sulphide blebs in silstone. 62.2-62.4m. Quartz vein with chlorite, some galena. 65.1-65.35m. Quartz vein with chlorite, minor pyrite. 66.9m. Quartz vein 5cm. thick with chlorite, pyrite. 69.1m. Quartz vein 6cm. thick with pyrite and galena. 69.9-70.1. Quartz veins with pyrite and galena in siltstone. 94.1-94.9m. Series of broken quartz veins in siltstone.

Note: The interval 69.0-80.5m. may represent a complex lode system. In the interval there are many quartz veins usually less than 10cm. thick with pyrite, galena and some sphalerite and possibly a trace of cassiterite in some samples. Also many sections contain sulphide material as blebs or as veinlets 1-2mm. thick. Quartz veins in the lode system greater than 10cm. thick are as follows 72.65-73.05m.,74.1-74.2m.,80.1-80.5m.

Union Extended D.D.H. 2, 56.5 m.

Rock Name:
Altered Basalt

Hand Specimen:
A massive, dark grey to black rock.

Thin Section:
This is an altered basic volcanic rock containing altered mafic phenocrysts disseminated through an altered matrix. The matrix contains elongate, almost acicular feldspar laths intergrown with finely divided biotite. The feldspar laths show some alteration to finely divided phyllosilicates although remnants of feldspar are still present. The biotite flakes exhibit an intensely pleochroic, dark brown colour and are evenly distributed through the matrix occurring mainly interstitially between the randomly oriented feldspar laths. A pale green, weakly pleochroic amphibole is also intimately intergrown with the matrix. The mafic phenocrysts now consist of a pale green, weakly pleochroic amphibole but their euhedral to subhedral shapes suggest that they were originally pyroxene. These phenocrysts locally form glomeroporphyritic aggregates up to several millimetres in size. Marginal to some of these phenocrysts the matrix contains a higher proportion of finely divided biotite flakes. The rock also contains a few highly altered plagioclase phenocrysts which generally exhibit subhedral, prismatic shapes and show extensive replacement by finely divided phyllosilicates.

The rock also contains some round to ovoid structures up to 0.3 mm in size which are believed to represent amygdales. Some are filled with quartz intergrown with pale green, weakly pleochroic amphibole and traces of calcite while other ovoid structures consist almost exclusively of pale green amphibole. Minor calcite is also present as small inclusions within amphibole crystals.

Opaques are disseminated through the rock as anhedral grains up to 0.1 mm in size.

This is a basalt which has suffered extensive alteration and possible low grade metamorphism to produce a finely divided, intensely pleochroic biotite and a pale green, weakly pleochroic amphibole. The feldspar has been largely replaced by weakly birefringent phyllosilicates.

APPENDIX III

PETROGRAPHIC DESCRIPTIONS

AMDEL

Union Extended, D.D.H. 1 - 23.4m.

Rock Name:
Lithic sandstone

Hand Specimen:
A massive, pale to medium-grey coloured rock.

Thin Section:
This is an immature detrital sediment comprised mainly of lithic clasts and quartz grains cemented by an interstitial phyllosilicate-rich matrix. The matrix is comprised mainly of finely divided sericite-clay and a pale green chlorite, all of which form very small flakes concentrated in angular, interstitial areas and along grain margins.

The lithic clasts have angular shapes and are up to several millimetres in size. They are comprised mainly of volcanic rock clasts and finely divided chert clasts which could represent silicified acid volcanic rocks. The volcanic rock clasts appear to range from an andesitic to rhyolitic composition with some being comprised mainly of feldspar laths but others consisting mainly of a devitrified matrix. Many of the rhyolitic clasts exhibit tuffaceous textures including remnant shard structures but others merely exhibit various forms of devitrification textures.

Detrital quartz grains are generally smaller than the lithic clasts (typically between 0.1 and 0.5 mm in size) and exhibit angular to sub-angular shapes. A few larger muscovite flakes are also disseminated through the rock and are probably of detrital origin. Traces of carbonate were also noted locally as inclusions within some lithic clasts. This carbonate is unaffected by the alizarin red-S stain, indicating it is not calcite. Minor opaques are disseminated through the rock as anhedral grains and granular aggregates up to 0.2 mm in size.

This is an immature detrital sediment containing abundant lithic clasts comprised mainly of volcanic rocks with an acid to intermediate composition. Although the rock has been termed a lithic sandstone the name 'greywacke' could also be applied.

Union Extended D.D.H. 3, - 28 m.

Rock Name:
Altered Basalt

Hand Specimen:
A massive, dark greenish-grey coloured rock.

Thin Section:
This is a highly altered rock consisting mainly of a feldspar and biotite rich matrix through which highly altered phenocrysts are disseminated. The matrix feldspar for the most part has a somewhat granular character although at least locally remnant lath shapes are still evident. Much of the feldspar shows incipient to pervasive alteration to finely divided phyllosilicates. The biotite intergrown with the matrix tends to form elongate, acicular crystals with a dark brown, intensely pleochroic colour. Much of the biotite also has a somewhat altered, degraded character containing finely divided opaque to translucent inclusions.

The disseminated phenocrysts generally exhibit subhedral, prismatic shapes and appear to represent completely altered mafic phenocrysts. These phenocrysts have been replaced by amphibole and a fibrous, pale brown phyllosilicate which at least locally are intergrown with calcite. Calcite is also disseminated through the matrix of the rock as small crystals and granular aggregates. The calcite was identified by positive reaction to the alizarin red-S stain and comprises a significant proportion (5-10%) of the rock.

The quartz is present as bodies up to 1 mm in size which are believed to represent deformed amygdales. Within these areas the quartz has a polycrystalline character with sutured grain margins indicating deformation. Some of the amygdales also contain intergrown calcite and amphibole. Finely granular quartz is also disseminated through the matrix of the rock at trace to accessory levels.

Opaques are disseminated through the rock as anhedral grains up to 0.2 mm in size.

This is a basaltic rock which has suffered extensive alteration and also shows evidence of at least a moderate degree of deformation.

Union Extended D.D.H. 3 - 30.4 m.

Rock Name:
Argillaceous Sandstone

Hand Specimen:
A massive, grey coloured rock.

Thin Section:
This rock is comprised mainly of sand sized detritus cemented by a somewhat recrystallized, phyllosilicate-rich matrix. The matrix is comprised mainly of fibrous sericite and a pale green, weakly pleochroic chlorite with anomalous interference colours and has a well defined lepidoblastic foliation.

The major detrital component is quartz which forms angular to subangular grains up to 0.5 mm in size. Smaller amounts of feldspar with a similar size and shape to the detrital quartz grains are also disseminated through the rock and consist of both polysynthetically twinned plagioclase and untwinned orthoclase. Lithic fragments are a significant proportion of the detritus and although most have a similar size and shape to the detrital quartz and feldspar some larger lithic fragments up to 2.5 mm in size are also present. Some of the lithic fragments are comprised of acid volcanic rocks with devitrification textures but others appear to consist mainly of fine grained, argillaceous sediments. Some of the argillaceous lithic fragments have highly deformed shapes and are difficult to distinguish from the phyllosilicate-rich matrix.

The rock is cut by a few veins up to 0.5 mm wide along which chlorite is concentrated as well developed flakes up to 0.3 mm in length. These veins are also locally filled with granular quartz, carbonate and prismatic tourmaline crystals. The tourmaline is moderately pleochroic in shades of green and brownish-green. Opaques are also concentrated in these veinlets as anhedral grains up to 0.4 mm in size. Calcite is generally intergrown marginal to these opaque grains.

Opaques are also disseminated through the rock as anhedral grains generally below 0.2 mm in size. Traces of detrital tourmaline with a pleochroic yellowish-brown colour are also disseminated through the rock as angular to well rounded grains.

This is an immature detrital sediment comprised largely of quartz, feldspar and lithic clasts cemented by a recrystallized phyllosilicate-rich matrix. Although the rock has been termed an argillaceous sandstone it could also be called a lithic sandstone or greywacke.

Union Extended D.D.H. 3 - 54 m.

Rock Name:
Altered Andesite

Hand Specimen:
A massive, grey coloured rock.

Thin Section:
Most of this rock consists of randomly oriented plagioclase laths intergrown with a finely divided, degraded biotite with a smaller amount of granular quartz. The plagioclase laths are typically about 0.2 mm in length and are generally untwinned or show vague, polysynthetic twinning.

Most of the biotite forms very finely divided flaky aggregates up to 1 mm in size which have a greenish-brown colour. A few larger pleochroic brown to greenish-brown biotite flakes are also disseminated through the rock but generally have margins of finely divided biotite suggesting marginal granulation has occurred. Finely divided biotite also occurs interstitially between the randomly oriented plagioclase laths.

Quartz is disseminated through the rock as grains generally below 0.2 mm in size which locally form ovoid granular aggregates. A round to ovoid structure of ~~the~~ many of the quartz bodies suggests that they represent amygdales. Calcite is also disseminated through the rock mainly as small grains and granular aggregates. Minor calcite is locally intergrown with some small quartz filled amygdales.

The rock is cut by several veins up to 5 mm wide which are comprised mainly of granular calcite. Chlorite is also concentrated in and marginal to these veins as fibrous flakes and flaky aggregates with a pale green weakly pleochroic colour and anomalous interference colours. Minor granular quartz and plagioclase also occur locally within these veinlets.

Anhedral grains and granular aggregates of opaque to translucent material up to 0.1 mm in size are disseminated through the rock.

This is a fine grained igneous rock of intermediate composition believed to be of volcanic origin which has suffered extensive alteration and some deformation.

Union Extended, D.D.H. 3 - 56.3 m.

Rock Name:
Meta-Diorite

Hand Specimen:
A greenish-grey coloured rock cut by a few dull white veinlets.

Thin Section:
This sample is comprised mainly of randomly oriented amphibole crystals intergrown with interstitial plagioclase. The amphibole crystals have a pale green weakly pleochroic colour (probably actinolite) and a somewhat fibrous texture. Most of the plagioclase is untwinned but a significant proportion exhibits a slightly turbid character within the core regions produced by finely divided inclusions. This turbidity is typical of heated or metamorphosed plagioclase. The plagioclase and amphibole intergrowths have a somewhat igneous, sub-ophitic texture which appears to have been modified by metamorphism.

Well developed biotite flakes up to 0.5 mm in length are disseminated through the rock and exhibit a random orientation. These biotite flakes have a dark brown, intensely pleochroic colour and locally show marginal replacement by pale green, actinolitic amphibole. Abundant calcite is also disseminated through the rock as xenomorphic grains intergrown with the amphibole and feldspar. Calcite is also concentrated as veins up to 1 mm wide which would represent the dull white veins noted in hand specimen.

Apatite is disseminated through the rock as prismatic crystals up to 0.1 mm in length. Anhedral grains and granular aggregates of opaque and semi-opaque material are also disseminated through the rock. Minor opaques tend to be intergrown locally with biotite as incipient alteration products around their margins or in cleavage traces. A few basal sections of biotite exhibit acicular, crystallographically oriented inclusions of a titanium mineral similar to that noted in some biotite flakes in rocks described for Report GS 1846/79.

This is believed to be a fine to medium grained igneous rock which has suffered low grade metamorphism to replace most of the primary pyroxene by actinolitic amphibole. The biotite could be an original igneous phase and also shows some incipient replacement by amphibole.

PLATE 1

131°45'

13°30'

13°35'

13°40'

Burrundie Siding

Boomleera Siding

GMLs 144A–147A

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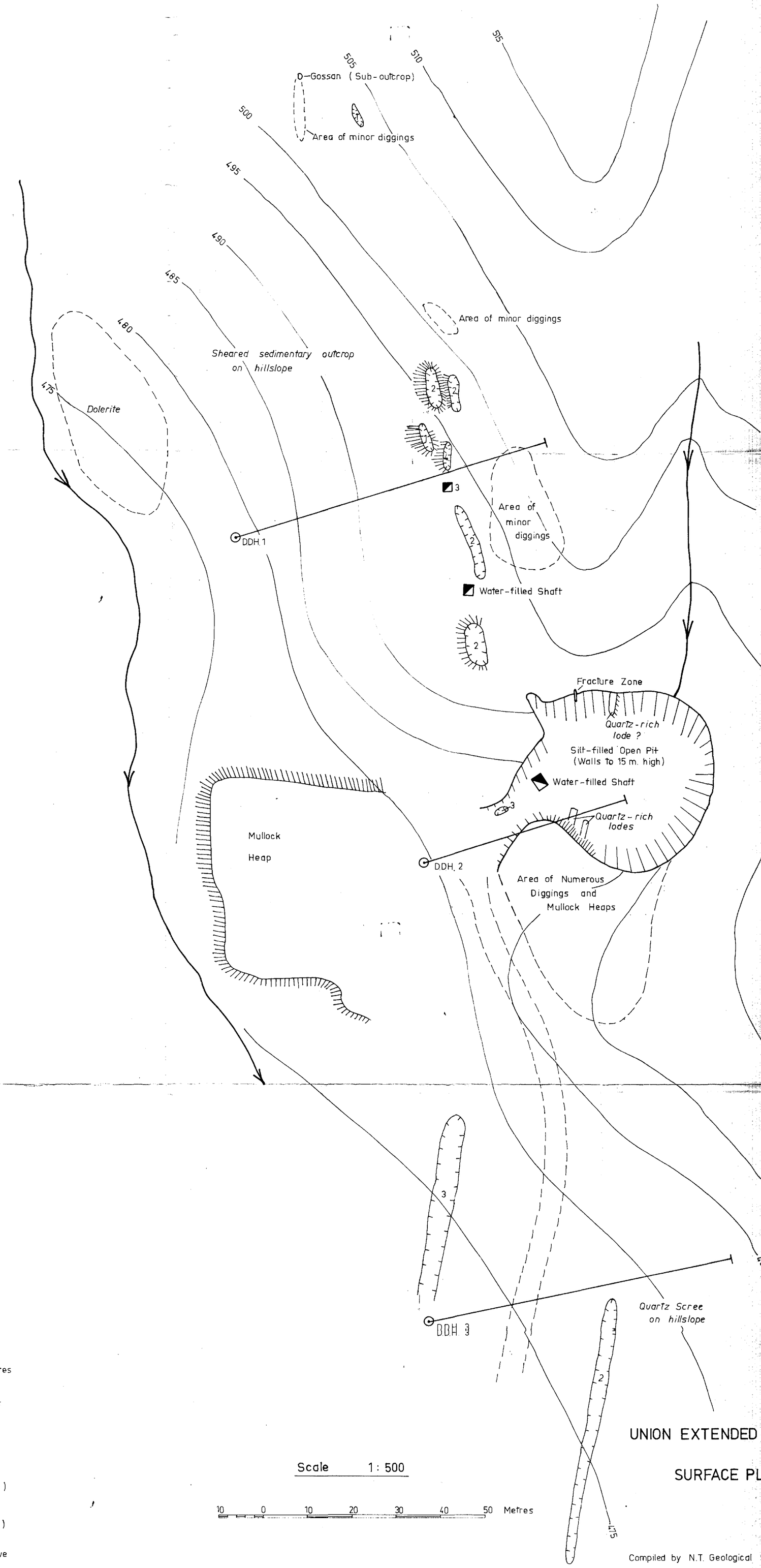
UNION EXTENDED GOLD MINE N.T.
LOCATION PLAN

Scale 1:100000

0 1 2 3 4 5 6 7 8 9 10 Kms

STUART HWY.

G79/11E



REFERENCE

- 3 — Vertical Shaft with depth in metres
- 2 — Shallow Pits and Mullock Heaps with pit depth in metres
- Access Track
- Outcrop Boundary (approximate)
- Watercourse (drainage pattern)
- 490 — Topographic Contour with relative elevation in metres.

Scale 1 : 500

10 0 10 20 30 40 50 Metres

UNION EXTENDED GOLD MINE N.T.

SURFACE PLAN

Compiled by N.T. Geological Survey

Drawn by Dept. of Mines and Energy Drafting Section Sep. 1979