AUSTRALIAN GOVERNMENT

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DEPARTMENT OF THE NORTHERN TERRITORY

NORTHERN TERRITORY GEOLOGICAL SURVEY RECORDS

1975/1

A SUMMARY OF INVESTIGATIONS WITHIN RESERVE NO. 275, MARY RIVER, N.T.

by

M.R. DALY

NORTHERN TERRITORY GEOLOGICAL SURVEY

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CONTENTS

1. SUMMARY

This report summarises investigations carried out within Mining Reserve No. 275, to the end of 1973.

Geological and diamond drilling surveys after 1970 are described in greater detail than other work since the information has not been included in previous reports. Detailed information on geophysical surveys are included in records produced by the Bureau of Mineral Resources.

Diamond drilling beneath the Gubberah Gossan has tested a mineralized lode over a strike length of 270 feet (82 m) and to a vertical depth of 300 feet (91 m). The true width of the lode varied from 60 feet (18 m) in D.D.H. 3 to 25 feet (7.65 m) in D.D.H. 5. In D.D.H. 3, 17.5% combined zinc and lead occurs over a true width of 21 feet (6.4 m); in D.D.H. 4, 18% combined zinc and lead occurs over a true width of 11 feet (3.4 m); and in D.D.H. 5, 4.3% combined zinc and lead occurs over a true width of 4 feet (1.2 m).
A diamond drill hole into the Gubberah South Gossan revealed only thin mineralized veinlets.

2. INTRODUCTION

During a helicopter reconnaissance survey for iron ore by officers of the Resident Geological Section in 1966, a gossanous outcrop containing anomalous lead, copper and zinc values was located approximately 4 km north of the junction between the Mary River and Minglo Creek (Shields and Taube, 1967).

In order to investigate this gossan further, Government Mining Reserve No. 275 of about 65 km^2 was proclaimed on December 21, 1966 (N.T. Gazette No. 63).

Plate 1 shows the location of the Reserve. Access can be gained from the Stuart Highway through Grove Hill and Mt. Wells to a point just south of the Mary River Mines Battery where a track (old Minglo road) trends eastwards through the southern part of the Reserve. The Mary River crossing and approaches need reconstructing after every "wet season" to make access possible.

The Bureau of Mineral Resources carried out geophysical surveys during 1967 and 1970-73. Mines Branch, Department of N.T. undertook auger geochemical surveys in 1967, 1969, 1970-71 and completed six diamond drill holes (total 750 metres) between 1970 and 1973.

3. GEOLOGY

The Regional Geology is depicted on the northwestern parts of the Pine Creek 1:250 000 and the Ban Ban 1:63 360 Geological Series Sheets. Rocks in the area are included in the Masson Formation and consist mainly of quartz greywacke, pyritic carbonaceous siltstone and quartz conglomerate with some dolomitic marl and

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chert lenses. The rocks of this formation are similar to those of the Golden Dyke Formation which outcrops a few miles to the east except that a significant proportion of arenaceous rocks are present in the Masson Formation.

Semi-detailed geology of the central southern portion of the Reserve is shown on Plate 2. The main part of this area consists of a black soil plain between north-west trending ridges. Auger drilling into black soil plain has shown that carbonaceous siltstone/shale and sandstone occur in approximately equal proportions. The carbonaceous siltstone/shale does not outcrop in this area. Sandstone has a tendency to outcrop in low ridges particularly where silicification and ferruginisation occur adjacent to quartz and quartz-hematite veins.

Outcrop increases in the hills to the north and indicates a greater proportion of sandstone in this area. Some of the sandstone beds are conglomeratic. Substantial thicknesses of pyritic carbonaceous siltstone/shale were intersected in D.D.H.'s 2,3 and 5.

The siltstone/shale beds rarely outcrop. However, in the southern part of the Reserve, thermal metamorphism near the northern margin of the Cullen Granite has rendered the siltstone and shale resistant enough to form outcrops along a north-west trending ridge. The slate is commonly spotted due to andalusite and cordierite. This occurrence is not recorded on the Ban Ban One mile sheet, which shows the area as quartz greywacke. No granite outcrops were observed within the Reserve.

Bedding strikes mainly north-west except in the vicinity of the Gubberah Gossan where it is more westerly (plate 3). Observed dips are mainly to the south-west. An exception occurs in the contact metamorphic zone where local north-easterly dips indicate a synclinal structure. Minor folds with steep plunges were also observed in this area.

Faulting and shearing occur along two main directions, trending approximately north-west and north-east.

The quartz-hematite gossan near D.D.H. 1 trends nearly north-west and outcrops as a slight rise for a length of approximately 200 m. A quartz vein with some boxwork structures which outcrops on the side of the hill to the north-west may be part of the same fault zone. At the southern end, the gossan is displaced by a north-east trending fault just south of D.D.H. 1. Evidence for a north-east striking fault north of D.D.H. 1. includes the trend of lead geochemical anomalies (plate 3), abundant vein quartz in cuttings from auger holes drilled in 1969, and the occurrence of a slight rise and greater tree density along this line. These features are particularly well marked on the east side of the gossan; evidence for faulting of the west side is not as clear. This faulting does not appear to displace the gossan.

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The Gubberah Gossan is part of the north-east trending fault system. This prominent topographical feature, which forms the crest of a ridge with sheer drops of up to 6 m. on the eastern side and up to 15 m. on the western side, is composed of quartz, hematite and sheared sedimentary rocks. The length is approximately 335 m with outcrops becoming thin and intermittent to the north and south. The outcrop appears to dip steeply west to vertical. A plane table survey map of the Gubberah Gossan area is shown on plate 3.

4. GEOCHEMISTRY

Auger geochemical surveys were carried out in 1967, 1969 and 1970. The grid layout and contoured geochemical results for copper, lead and zinc from the three surveys are shown on plates 4, 5 and 6 respectively. (Grid coordinates are in feet + 100)

A Gemco auger drill was used to obtain, where possible, bit samples of weathered bedrock beneath the alluvial and black soil cover. Where the drill did not penetrate to bedrock, a sample of soil or alluvium was collected from the bit. Areas inaccessible to the drill were chip sampled from outcrop or from alluvium approximately 12 inches below the surface.

Copper geochemical values (plate 4) are relatively low and the contours have no significant pattern. The anomalies are isolated and limited in extent. The highest copper value is 275 ppm at 28E/30S. The main lead and zinc anomalies (plates 5 & 6) show a similar south-easterly trending pattern and both are unclosed in this direction. As contoured, the lead-zinc anomalous zone is about 240 m wide with a trend of 325° which is approximately parallel to the strike of sedimentary rocks. To date, the anomalous zone has been traced continuously between median points 4W/22S and 24E/60S, a distance of about 1,500 m. The peak value for lead is 9,000 ppm at 8E/32S and 8E/36S and for zinc is 4,400 ppm at 8E/38S.

Background values in the pyritic, carbonaceous siltstone and shale probably account for this anomalous zone, with the exception of the higher peaks. In particular, the anomalies associated with gossanous outcrops and the south-west trending anomaly with peaks at 8E/32S and 4E/36S, which cuts across the strike of beds, are significant in that they are unrelated to the black shale. These anomalies warrant further investigation, as they were not fully tested by D.D.H. 1.

For six of the auger holes, samples were taken at 5 feet (1.5 m.) intervals down the hole and were analysed for copper, lead, zinc and nickel. These indicated little variation in the geochemistry of bedrock samples, showing that deep holes are unnecessary in this area. The thin cover of light grey sand and silt has lower geochemical values than the bedrock, and the lateritic clays, where present, commonly have slightly higher lead and zinc values than the bedrock.

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Chip samples were taken across outcrops of the two gossans at intervals of 50 feet (15 m), and were geochemically analysed for copper, lead, zinc, nickel and silver. Copper and silver values were generally low, with highs of 500 ppm and 4 ppm respectively. Nickel values were discarded because of contamination from the grinding vessel. Lead and zinc values are shown on plate 7.

For the Gubberah Gossan, the highest lead value was 3.1%; only three values were below 0.5%. All values of lead, except one, for the southern gossan were also anomalous, with a peak of 1.7%. Zinc values for both gossans were much lower than lead, probably due to greater mobility. A few zinc values were anomalous.

5. GEOPHYSICS

Geophysical surveys were undertaken by the Bureau of Mineral Resources in 1967, 1970, 1971, 1972 and 1973. The areas investigated are shown on Plate 11.

In 1967, Slingram (electromagnetic), self potential, magnetometer, and radiometric methods were used in conjunction with the auger geochemical survey (Shields & Duckworth, 1969). These surveys attempted to trace possible extensions of the Gubberah Gossan to the south-west beneath the black soil plain (Gubberah South West grid). No radioactivity was associated with the Gubberah Gossan, so that this method was not used across the black soil plain. Slingram showed two disturbed zones (A & B) both trending approximately north-south. The zone to the west of the gossan (A) was thought to be due to graphitic shale, while the one south of the Gubberah Gossan (B) was possibly due to an extension of the gossan with a marked change in trend. Gossanous material was present in the vicinity of Anomaly B. Results of a self potential traverse across Anomaly B agreed well with the Slingram results. A magnetic traverse indicated a feature which corresponds to Anomaly B.

In 1970, Slingram, Turam and magnetic measurements were made over a gossanous outcrop known as Gubberah South (Williams, 1971). Self potential and resistivity measurements were attempted but failed due to dry conditions. Electromagnetic and minor magnetic anomalies occur close to the geochemical anomalies. The north-west trending electromagnetic anomalies were thought to be due to conducting carbonaceous rocks rather than to base metal mineralisation. Breaks in the contours may indicate faults.

The 1971 geophysical survey (Bullock, 1971) used the self potential method over the Gubberah South grid (same grid as 1970 survey). No correlation of the results with previous geochemical or geophysical results was apparent. An undisturbed area to the west of the gossan and a disturbed area to the east probably reflect changes in lithology rather than sulphide mineralisation. Geochemical anomalies occur only in the disturbed zone, but there is no correlation with individual S.P. anomalies.

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A low level airborne magnetic survey was carried out in 1972 over Reserve 275 and adjacent areas to the south, east and west. The contour map indicates that the granite contact probably occurs close to the south-west corner of the Reserve and has an east-south-easterly trend. A highly disturbed magnetic zone with a width of about 180 m extends from the granite contact to just north of the Gubberah Gossan.

The 1972 ground survey (Michael and Young, in prep. and Spies, in prep) studied the geophysical responses from known mineralisation at the Gubberah Gossan and Minglo Mine and undertook reconnaissance surveys over two areas selected from the aeromagnetic data (Minglo 1 & 2 areas). Magnetic, gravity, electromagnetic (Slingram, Turam, Transient E.M.) and S.P. measurements were made.

The Gubberah Gossan did not show any magnetic response. A strong S.P. anomaly with north-north-west trend at the southern end of the Gossan, Turam anomalies which parallel the strike of the bedding, an S.P. anomaly and Transient E.M. anomalies are all probably due to conducting carbonaceous shale. Discontinuities in Transient E.M. anomalies were thought to be due to a fissure filling of quartz and/or sphalerite. Results for the gravity traverse were inconclusive.

The Minglo area was chosen to investigate an aeromagnetic anomaly within a west-north-west trending magnetically disturbed zone. The following conclusions were reached: "that the ground geophysical reconnaissance work at Minglo 1 has not resulted in the delineation of any outstanding feature which in anyway might be indicative of sulphide mineralisation. The association of electromagnetic and S.P. anomalies over the southern part of the Minglo 1 grid must be interpreted as evidence for the presence of carbonaceous rock units based on the results obtained in the Gubberah locality. The added association of both short and long wave length magnetic anomalies with this region can only be interpreted at this time as evidence for metamorphism."

The Minglo 2 area was chosen to investigate a prominent west-north-west trending aeromagnetic anomaly. Carbonaceous shale is the probable cause for the extensive E.M. anomalies. Lack of diagnostic S.P. anomalies may have resulted from measurements being made mainly from within a large regional anomaly.

In 1973, surveys were carried out in the Gubberah, Gubberah South, Minglo 2 and Mary River West areas (Major, in prep. and Hone, in prep.). A coincident Transient E.M. and magnetic anomaly was delineated in the Minglo 2 grid and a diamond drill hole site was pegged at 86.5W/25.5S.

In the Gubberah Gossan area, Transient E.M. and Potential Drop Ratio results indicate a resistive feature coinciding with the Gossan within a conductive host rock. Topographic and unknown weathering effects make the recognition of a gravity anomaly uncertain. The Gubberah South Gossan is in a zone of low conductivity and has no magnetic or gravity response.

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The work carried out on Mary River West grid indicates that the area can be divided into the following 5 zones based on magnetic and Transient E.M. data and rock outcrops:

(1) low magnetic relief and very low conductivity - granite
(2) high magnetic relief and slightly higher conductivity than 1 - metamorphic aureole
(3) & (5) magnetic lows and high conductivity - probable carbonaceous shale
(4) magnetic highs and lower conductivity than 3 & 5 - less carbonaceous shale than 3 & 5.

6. DIAMOND DRILLING RESULTS

Six diamond drill holes totalling 760 m have been completed in the area. D.D.H. 1 was drilled in the Gubberah South area, D.D.H.'s 2-5 at the Gubberah Gossan, and D.D.H.E.M. 1 into a transient electromagnetic anomaly just south of the Reserve boundary.

Geological logs and assay results for the drill holes are included in Appendix I. Petrological descriptions for some core samples are contained in Appendix II.

Gubberah South

D.D.H. 1 was positioned at 9.3E/34.5S and depressed 50° on a bearing of 245° magnetic, to test a 9000 ppm lead anomaly located at 8E/36S within the south-east trending zone of lead-zinc anomalies. This zone of anomalies coincides with a low outcrop of quartz-hematite gossan (southern gossan) which is very thin and cross faulted at its south-eastern outcrop extremity, in the region tested by D.D.H.1 (plate 2). Sedimentary rocks in this area dip steeply to the south-west.

Rocks intersected in D.D.H. 1 are sandstone and pyritic carbonaceous siltstone of the Masson Formation, veined by quartz and carbonate. The sandstone ranges from very coarse to fine, and contains many graded beds with thin siltstone and/or shale tops. The shale is black, sooty and carbonaceous, with abundant pyrite along bedding planes and in cross cutting veins.

Minor galena, sphalerite and pyrite mineralisation is associated with the quartz and carbonate veining. (See Appendix I for assays). The 4.1% lead assay from scrapings between 248' and 250' (75.6 m - 76.2 m) was not substantiated when check split core samples were taken. Scraping of this core may have dislodged small specks of galena to give a biased sample.

The carbonate-quartz zone from 422' to 440' (128.6 m - 134 m) contains pyrite, and specks and patches of sphalerite and galena up to 0.75 inches (about 2 cm) in diameter. Split core from 425' to 430' (129.5 m - 131 m) yielded the highest values of 0.61% zinc and 0.11% lead.

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The sandstone sections, 403' to 420' (122.8 m - 128 m) and 445' to 475' (135.6 m - 144.8 m) contain numerous thin carbonate veins with pyrite, sphalerite and galena. The following are the highest assays for split core samples: 3.5% zinc (465' - 470' or 141.7 m - 143.2 m), 1.2% zinc and 0.1% lead (470' - 475' or 143.3 m - 144.8 m). Copper values are low, usually below 100 ppm. Nickel values shown in Appendix 1 should be disregarded due to contamination from the grinding plates.

The dip of the southern gossan cannot be determined, as correlation of the outcrop with veins intersected in D.D.H. 1 is uncertain. If correlated with the quartz vein from 241' to 248' (73.5 m - 75.6 m) down hole, then the dip is about 80° to the north-east; if correlated with the quartz-carbonate zone from 422' to 440' (128.6 m - 134 m), then the dip is approximately 75° to the south-west. Correlation is made more uncertain because D.D.H. 1 was drilled in the vicinity of an inferred fault, which may cut across and displace the gossan.

Gubberah Gossan

Locations for the drill holes are shown on plate 3 and drill hole sections on plates 8 - 10.

D.D.H. 2 was drilled with 45° depression from the eastern side of the gossan and had to be abandoned due to drilling difficulties at 531 feet (162 m). There is a possibility that the lode commenced 2 feet (0.6 m) before the end of the hole when quartz, brecciated sedimentary rocks and minor pyrite were intersected. The remainder of the core consists of sandstone except for approximately 80 feet (24 m) true thickness of carbonaceous, pyritic siltstone and shale. The drill hole reached a sufficient depth to indicate that the lode zone probably had a westerly dip. The remaining 3 holes were drilled from the western side of the gossan after access was gained using a bulldozer.

In D.D.H. 3, a lode consisting of quartz, brecciated sedimentary rocks and massive sulphides (principally sphalerite) was intersected between 275 feet and 356 feet (83.8 m. - 108.5 m) - true width approximately 60 feet (18.3 m). Zinc averaged 7.4% and lead 0.5% over this interval. Between 308 and 336 feet (93.9 m - 102.4 m) - approximately 21 feet (6.4 m) true width - zinc averaged 16.6% and lead 0.9%. The highest zinc value was 50.5% between 310 and 312 feet (94.5 m - 95.1 m) and the highest lead value was 11% between 308 and 310 feet (93.9 m - 94.5 m). The highest silver value was only 0.8 ounces/ton between 310 and 312 feet (94.5 m - 95.1 m). Shale/siltstone (pyritic and carbonaceous in the unweathered zone) was intersected from the surface to 202 feet (61.6 m). The remainder of the core, except for the lode zone, is sandstone with minor siltstone.

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In D.D.H. 4, the main lode was intersected between 308 and 365 feet (93.9 m - 111.2 m) - true width approximately 40 feet (12.2 m). This interval averaged 9.1% zinc and 0.1% lead, while the section between 340 and 355 feet (103.6 m - 108.2 m) - approximately 11 feet (3.4 m) true width - contained 17.7% zinc and 0.4% lead. Silver values were mostly less than 2 ppm with a high of 14 ppm between 352 and 355 feet (107.3 m - 108.2 m). Other quartz sulphide veins were intersected between 226 and 227.5 feet (68.9 m - 69.3 m), 231.5 and 233 feet (70.6 m - 71 m), 260 and 261.5 feet (79.2 m - 79.7 m), 263 and 264 feet (80.2 m - 80.5 m), 271 and 276.5 feet (82.6 m - 84.3 m), and 285.5 and 287 feet (87 m - 87.5 m) (See Appendix I for assay results).

In D.D.H. 5 the lode was intersected between 272 and 301 feet (82.9 m - 91.8 m) - true width approximately 25 feet - and averaged 1.1% zinc and 0.3% lead. The interval between 276 and 282 feet (84.1 m - 86 m) - 5 feet true width - averaged 4.1% zinc, 0.2% lead and 0.6 ounces/ton silver. The remainder of the core consists of carbonaceous siltstone/shale with a few barren quartz veins.

The lode dips between 70° and 80° to the north-west. The thinnest intersection was in D.D.H. 5 where the lode occurred within carbonaceous, pyritic siltstone (plate 8). The gossanous outcrop also thins in the region where it is in contact with siltstone as extrapolated to the surface from D.D.H.'s 2, 3 & 5 (plate 3).

Examination of diamond drill cores indicates that intense leaching of the sedimentary rocks has occured to a depth of 100 to 150 feet (30.5 m - 45.7 m) below the gossan outcrop.

D.D.H. E.M. 1 was drilled to test a coincident magnetic and transient E.M. anomaly in the Minglo No. 2 area. The hole was drilled vertically for 293 feet (89 m) at grid coordinates 86.5W / 25.5S. The core consisted entirely of carbonaceous shale/siltstone. Much of the rock has a spotted texture due to thermal metamorphism from the adjacent granite. The main sulphide mineral (10% in some zones) is pyrrhotite, and this is the probable cause of the distinctive magnetic zone which is apparent on the airborne map adjacent to the granite contact.

7. CONCLUSIONS & RECOMMENDATIONS

Diamond drilling at the Gubberah Gossan has so far tested the lode over a strike length of 270 feet (82 m) and to depth of 300 feet (90 m) vertically below the outcrop. Over this interval, the mineralised zone is up to 60 feet (18.3 m) wide and reached a peak metal content of about 40% combined lead and zinc over an estimated true width of 2.4 m in D.D.H. 3. However, considerable additional diamond drilling will be required before meaningful estimates of tonnage and grade can be calculated.

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Further drilling is also required to test the significance of the southern gossan and associated auger geochemical anomalies.

Little attention has been paid to the area of the Reserve north of the Gubberah Gossan. This area should be checked for gossanous outcrops. A stream sediment geochemical survey may assist in locating mineralisation in this area which would be largely inaccessible to an auger drill.

The zone of magnetic anomalies adjacent to the granite is probably caused by thermally metamorphosed carbonaceous siltstone/shale containing abundant pyrrhotite.

8. ACKNOWLEDGEMENTS

The Bureau of Mineral Resources supplied information for the geophysical surveys (Section 5) and the mineralogical descriptions for selected core specimens (Appendix II).

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APPENDIX I

DIAMOND DRILL LOGS AND ANALYTICAL RESULTS, RESERVE 275.

D.D.H. 1.	G71/59E - 64E
D.D.H. 2.	G71/65E - 69E, G71/212E
D.D.H. 3.	G71/213E - 217E
D.D.H. 4.	G73/54E - 58E
D.D.H. 5.	G73/59E - 61E

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

GEOLOGICAL LOG OF DRILL HOLE

PROJECT: MARY RIVER RESERVE — REMARKS — SCALE: 1" = 10'

HOLE No: D.D.H. 1 — CO-ORDINATES: 930 E / 3450 S — R.L. GROUND

LOCATION: 1½ MILES N.E. MARY RIVER CROSSING — ANGLE FROM HORIZONTAL: 50° — DIRECTION: 245°

DESCRIPTION OF CORE	R.L. CASING / DEPTH SIZE OF CORE	LOG	% RECOVERY	SAMPLES	REMARKS	ASSAYS
10'		NO CORE				
20' NIL CORE						
30'						Cu Pb Zn Ni (values in p.p.m)
SHALE, SILTSTONE & minor SANDSTONE: light grey in weathered zone, dark grey below 88'; iron oxide coated joints.		NX	10%	SCRAPE SAMPLES - 10' INTERVALS		35 40 130 220
Slate cleavage present.						
b: 28° @ 86' ; 30° @ 89'					b = 30° → most probable dip of beds = 80° to S.W.	
40' 26° @ 92'6" ; 42° @ 96'						
87'9"-88': F-C_SS.						
92'6"-93': F-M_SS.						
94'-96'6": M-SS., brecciated & quartz injected.						60 40 120 350
50' 94'6"-96'6": interbedded Siltstone/ Fine Sandstone + Shale: top 6"						
is sheared, with iron oxides						
coating fractures. micro faulting,						
mainly 10° to CA (same sense as bedding).						30 20 100 590
Pyrite associated with thin						
60' release - chlorite? veins.						
96'6"-96'9": M-SS: brecciated, quartz veined, pyritic.						25 20 77 130
98'-98'6": Siltstone/F-SS.						
70'						
						35 10 110 870
~75': very brecciated, sheared;						
80' some gossanous looking vein						
material.		BX	18%			
90'-92': brecciated, sheared & contorted beds (pre consolidation slump); thin Fe ox. veinlets & quartz vein at top.						25 10 71 140
90' 96'9"-98': Shearing, slickensiding; contortion of beds.			70%			
98'6"-99': Sheared, contorted.						
			88%			100 40 280 650

DRILL NO. ..... TYPE .....

DRILLER: MINES BRANCH

COMMENCED .....

COMPLETED .....

CASING IN HOLE DURING DRILLING

EXPLANATION: All angles measured to core axes. b. bedding angle

REFERENCES: SHALE (SLATE), SILTSTONE; SHEAR ZONE; SANDSTONE (SS) C - COARSE, M - MEDIUM, F - FINE; MUD PEALETS, CONGLOMERATE; QUARTZ VEIN; → GRADATION UPWARDS; CC CARBONATE VEIN

HEAD OFFICE

LOGGED BY: M.R. DALY

DRAWN BY: M.R.D.

CHECKED BY: .....

SHEET 1 OF 6

DRAWING NO. .....

GD130

G71/59E EJ

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

GEOLOGICAL LOG OF DRILL HOLE

PROJECT: MARY RIVER RESERVE — REMARKS — SCALE 1" to 10'

HOLE No: D.D.H. 1 — CO-ORDINATES — R.L. GROUND

LOCATION — ANGLE FROM HORIZONTAL: 52°20' — DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	% CORE RECOVERY	SAMPLES	REMARKS	ASSAYS
SANDSTONE (F→C) & some SHALE, SILTSTONE, particularly at top.				100%	SCRAPE SAMPLES - 10' INTERVALS		35 40 400 790
100'6"-101': Siltstone, shale: b=48°. 102'6"-103': Siltstone, shale: brecciated, microfaulted, quartz injected.							
103'6"-104'6": Shale, siltst. b=32°: pyrite associated with chloritic-talc veinlets.						CORE PYRITIC THROUGHOUT specks + blebs up to ¼" particularly in fractures + quartz veins.	
105'3"-105'9": laminated siltst. b=30°. 106'3"-106'6": Siltst. 107'2"-107'5": Siltst, shale. b=28°. 107'9"-107'11": Shale. 117'-117'6": Shale b. 35° @ 112'6"				97%			30 40 360 1100
108'-124': C→M-SS & numerous quartz veins ¼" thick - predominately 45°-60° to CA. 128'6": 3" quartz vein.				82%		SANDSTONE has slight schistose appearance throughout due to very fine shale laminae & slight shearing along bedding planes.	
Series of graded beds - indicate sediments right way up: 126'3"-129': pebbly - very C-SS → C→M → F-SS. 129'-131'6": Fine conglomerate - very C-SS → C-M → F-SS: conglomerate contains pebbles of quartz + slate shale. 133'6"-134'9": M→F-SS → Siltstone (top 9"); b.c. 34°.							25 40 420 740
134'9"-140'6": C, pebbly → M-F-SS → Siltstone/shale (top 3"): basal 6" contains black carbonaceous mud pellets. 140'6"-141'3": F-SS & mud pellets.				60%			35 40 220 1000
MUDSTONE & mud pellets, well rounded, spherical + ellipsoidal, up to 3½". Upper contact 30°; lower gradation M→F-SS with mud							
152'-158': F-M-SS → laminated siltstone, shale: b. 34°. lower b.c. 30°.							35 40 600 1300
158'-162': M-SS → laminated siltstone/shale. b. 30°-34°.				100%			
162'-164'6": M-C-SS → F-SS → laminated siltstone, shale. b. 31°-35°.							45 70 1250 1350
164'6"-168'6": C → M → F-SS → laminated siltstone/shale: b. 40°-45°.							
							45 50 330 420
SHALE, SILTSTONE & SANDSTONE interbeds: 168'6"-169'3": some F-SS, b. 42°. 169'3"-169'4": C-SS: 169'5"-169'11": M-C-SS. 169'11"-173': laminated siltstone, carbonaceous shale, soft, broken, b. 40°.				60%			
C-F-SANDSTONE, some SILTSTONE, SHALE: 173'9"-174': Siltstone; b. 35°. 174'6"-175': Siltst./F-SS. 175'8"-175'9": Siltst.							25 20 360 1700
180'-185'6": C-SS → M → F-SS → laminated siltst., shale (9"). b. 43°. 185'6"-188'9": C-SS → F-SS → shale, siltstone (3"). b. 36°. 188'-188'5": Siltst. b. 42°. 188'6"-188'6": Shale. 194'-195': Siltst., some F-SS. 198'-198'½": " , shale. b. 37°				100%			40 20 430 2350
Quartz veins @: 175'6": ¼" 177': ¼" 186': " 185': " 193'8": ½"				11%			
189'-195': Very broken.				100%			35 50 410 3700
				83%			
				100%			

DRILL NO. ..... TYPE .....

DRILLER ..... COMMENCED ..... COMPLETED .....

EXPLANATION — CASING IN HOLE DURING DRILLING

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT: MARY RIVER RESERVE — REMARKS: — SCALE: 1" = 10'

HOLE No.: D.D.H.1 — CO-ORDINATES: — R.L. GROUND:

LOCATION: — ANGLE FROM HORIZONTAL: 55° @ 300' — DIRECTION:

DESCRIPTION OF CORE	R.L. / CASING	DEPTH / SIZE OF CORE	LOG	TYPE & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
202'-202'3": Siltst. F-ss; b. 31° 203'-203'3": Siltst./shale 203'6"-207': C-m-ss → F-ss → siltst. → shale b. 44° 209'-209'3": Shale, siltst. & ss. lenses b. 35°-32° 209'5"-209'6": Shale. ←→ 210'-213': M-c-ss → F-ss 213'-215'3": C-ss → m-ss → F-ss 215'3"-215'6": Shale b. 27° 217'6"-218'3": Siltst. 222'-223': Shale 231'-241': Siltst./shale b. 25° silicified, quartz veined, very fractured Quartz veins: ½" @ 215'6", 219', 219'3"; 2" @ 220'; 1" @ 221'; ½" @ 222'; 1" @ 224'; 2" @ 226'; 3" @ 226'8"; ½" @ 228'; 3" @ 228'6"; + 22° to 50°, many similar angle to bedding. Very fractured 221'-232'; 237'-238' pyritic throughout				67%	SCRAPE SAMPLES - 10' INTERVALS		30 50 970 3000 35 50 4[illegible] 1150 30 50 6[illegible] 1700 20 310 1650 2740
SILTSTONE/SHALE: b. 25° silicified, quartz veined, very fractured.							
QUARTZ VEIN & some calcite, much pyrite some silicified sandstone - 242'2"-242'6"; 243'-243'6"					SPLIT CORE		15 500 90 2200 15 140 100 1500
SANDSTONE (C-F) & some siltstone & shale: 248'-248'6": C-pebbly ss/F-conglomerate - quartz & mica shale paddles. @ 248'6", ½" siltst./shale above 2½" F-m-ss. 248'9"-253'6": C-ss → F-ss → Siltst. shale (top 1'); quartz-calcite veins 253'6"-254.5': quartz, some calcite 255'-256'6": " 259'3"-262: C-ss → m → F-ss → laminated siltst (top 4") b. 28°-30° 263'-263': quartz, some dolomite, much pyrite, small crystals of galena				100%			* 1260 41,400 2300 4250 130 9,700 770 1200
267'-311'9": C-m some m-ss, hard silicified, dark grey, massive faint orientation (bedding) b. 30° @ 309'-20° Numerous thin quartz veins, less calcite. pyrite in fractures & quartz veins 276'6"-276'9": quartz. 298': ½" pyrite vein sub-parallel to quartz 306'-306': quartz vein & pyrite 309'6"-310': " 311'6"-311'9": "					SCRAPE SAMPLES - 10' INTERVALS		105 5,600 1600 2000 80 2600 1550 1150 255 3000 4200 1200 65 2700 1300 2100

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE — REMARKS

HOLE No D.D.H. 1 — CO-ORDINATES — R.L. GROUND

LOCATION — ANGLE FROM HORIZONTAL 54° @ 4.00' — DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
							60 3100 5040 3210
310'							
SANDSTONE & SHALE, SILTSTONE: 311'9"-312'3": black, carbonaceous shale, pyritic; irregular lower contact 5°-25°. 313'6"-314'3": shale, siltstone: at top contact, bedding very disturbed, microfaulting, granulation, thin quartz; pyritic; lower contact 3°. Quartz veins: 317'2"-317'6"; 318'-318'2"; 320'6"-321'.				100%			60 3000 3510 3210
320'							
CARBONACEOUS SHALE, some SILTSTONE: laminated black & grey. top 3" = 323'-323'6": sheared & brecciated. some thin quartz veins. much pyrite: in cross cutting veinlets & // bedding. bedding mostly // C.A., some variation up to 10°.				80%			70 750 1890 760
330'							60 430 420 670
M & F SANDSTONE: much thin quartz 338'3"-338'6", 340'3"-340'5": quartz.				100%			
340'							
CARBONACEOUS SHALE: irregular contacts 15°, sheared, deformed sand; pyritic & calcite.				88%			
M. SANDSTONE: silicified, many thin quartz veins. much pyrite 342': Fault 5° to C.A.; opp. sense to bedding. 344'-346'7": very fractured.							60 690 3780 970
CARBONACEOUS SHALE: black & grey laminated, soft. 6.: 12° @ 346'9"; 18° @ 348'; 15° @ 350'9". cleavage: 10° @ 346'9" - opp. sense to 6. 350'5"-350'9", 355'-355'6", 357'3"-357'6", 358'3"-359'6", 360'6"-361'6": very fractured. 351'-351'6", 353'3"-354': v. contorted, brecciated, polished = also bottom 3". 357'6"-357'9": SS., quartz veins. 356'-358'6": " " " " 359'6"-361'6": " " " "				100%			
360'				64%			90 750 610 1000
				100%			
C & M. SANDSTONE: much quartz veining, pyritic, some silicification. 362'-364': shear zone. numerous thin quartz veins. ½" quartz vein @ 368'. 2" " " " 369'. ½" " " " 369'9". 2" " " " 372'4". broken & sheared 376'-376'.				100%			60 3000 4200 1300
370'				90%			
				94%			
CARBONACEOUS SHALE: laminated b. 25°; distorted at bottom; b.c. 52°. pyritic: some small patches of talc.				32%			50 820 660 1500
380'				45%			
F-M. SANDSTONE: some silicification. numerous thin quartz veins. Pyrite veinlets & patches				15%			20 520 1200 1450
390'							
395'-403': very broken, sheared, much quartz.				19%			25 1500 120 3500
				3%			

67% SCHEME SAMPLES - 10' INTERVALS

DRILL NO. ..... TYPE .....

DRILLER ..... COMMENCED ..... COMPLETED .....

EXPLANATION

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS

HOLE No D.D.H. 1 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
M-C-SANDSTONE & much CARBONATE veining: sheared & brecciated sediment. Carbonate veins up to 6". much pyrite, particularly in the veins 409': patch sphalerite. 409'3": specks galena 414': " " & sphalerite. 417'2", 417'6": " " "		410'		3% 5% 72%	SPLIT CORE - 5' INTERVALS		60 100 5460 710 75 730 2940 590 15 350 1890 230
CARBONATE (CALCITE/DOLOMITE) & some included sediment. 424'-425'6": patches of galena sphalerite @ 426'6", 427', 427'6".		420'		100%			10 80 140 180
QUARTZ & CARBONATE veining & some sheared sediment. quartz ~70%; carbonate ~30%. much pyrite. 428'6"-428'9": specks sphalerite, much pyrite 429'-430': " " & galena		430'		12%			15 1100 6100 1300 10 20 330 1200 10 130 5460 1900
SILTSTONE, SHALE: very broken b. 22°		440'		7%	SCRAPE - 10' INTERVAL		30 320 450 1100
F-C-SANDSTONE & some thin SHALE, SILTSTONE: numerous thin carbonate veins, many containing pyrite. ½" SHALE @ 450', b(?) 30°		450'		95% 100%			45 750 1350 2450
sphalerite @ 467' & 467'6"		460'		69%	SPLIT - 5' INTERVAL		10 40 90 690
474'6"-475'6": siltstone, shale; b 30° @ 474'9", ½" carbonate vein & much sphalerite & pyrite: 50° to C.A., opp sense to b.		470'		38% 17%			25 500 35700 1000 30 1000 11550 760
M-C-SANDSTONE; fewer carbonate veins than above; a few quartz veins. quartz vein 486'-486'6" 490'6": b. 30°-40°. 491': galena & sphalerite in carbonate. 495'3"-496': grained F-SS to SILTST; b. 34° 496'-496'9": " M → F-SS → SILTST, SHALE; b. 40°. 497'-497'2": SHALE, silicic b. 45°. 496'6"-497': v. broken.		480'		65% 25% 44%	SCRAPE - 10' INTERVAL		620 250 2000 410
499': sphalerite		490'		93%			170 330 2300 20
501'2"-501'6": Shale. quartz vein 504'6"-505':		500'		67% 46%			98 313 1750 20

DRILL NO ..... TYPE .....

DRILLER .....

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EXPLANATION

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE — REMARKS

HOLE No D.D.H. 1 — CO-ORDINATES — R.L. GROUND

LOCATION — ANGLE FROM HORIZONTAL 53° @ 542' — DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
505'-506'3": Shale & calcite veins containing sphalerite.				46%			
506'6"-507'3": sphalerite & galena in carbonate & quartz veins.				15%			
512'-513'4": Shale b. 40°.							
513'3": Fault 25° to C.A - opp. sense to b.				83%			
515'-516' graded M → F - SS → Siltst/Shale (Top ?)				73%			15 150 210 870
516'5"-516'6"; 517'5"-517'6": faulted shale.					SS, F-S, Siltst		15 380 1250 1600
517'-520': much quartz veining (~3%) & silicification.				100%			50 320 3650 410
END OF HOLE					SLUMP	† Ni values should be discarded as the samples were contaminated during grinding.	

* Re-run split core samples; values in p.p.m.

		Cu	Pb	Zn	Ni	Ag
248	-250'	15	110	95	20	<2
250	-255'	5	130	120	20	"
255'	-260'	5	60	200	30	"
260	-265'	5	120	500	30	"
265'	-270'	<5	30	100	10	"
270'	-275'	"	20	45	10	"
275'	-280'	5	20	83	10	"
280	285'	20	260	610	20	"
285'	-290'	5	100	72	10	"

DRILL NO ... TYPE ... DRILLER ... COMMENCED ... COMPLETED ...

EXPLANATION — CASING IN HOLE DURING DRILLING

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PROJECT MARY RIVER RESERVE REMARKS

HOLE No. D.D.H. 2 CO-ORDINATES SEE PLATE 3. R.L. GROUND

LOCATION 270' EAST OF GUZZERAH GOSSAN ANGLE FROM HORIZONTAL 45° DIRECTION 315° mag

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
NIL CORE							
10' SANDSTONE & SHALE: core recovery too low for subdivision. leached							
20' bedding 10° @ 100°							
Quartz vein @ ~80' a80'.							
30' very fractured & sheared @ ~ 105'							
40'							
50'							
60'							
70'							
80'							
90'							

DRILL NO.

TYPE

DRILLER MINES BRANCH

COMMENCED

COMPLETED

CASING IN HOLE DURING DRILLING

EXPLANATION All angles measured to core axis (C.A.)

b bedding angle

REFERENCES

SHALE, SILTSTONE

SANDSTONE { C - Coarse, M - Medium, F - Fine

SHEAR ZONE

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS

HOLE No D.D.H. 2 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS

ASSAYS

	Cu (p.p.m)	Pb	Zn	Ag
100	610	60	<2	
35	410	220	6	
70	630	220	15	
55	560	160	2	
100	200	290	15	
45	30	110	4	
30	50	120	6	
55	50	120	38	
95	120	140	66	

CARBONACEOUS SHALE, SILTSTONE

110' banded shale black, siltstone light + dark grey.

leaching: core is lighter in colour above 118'; pyrite occurs below 130' - above 130' numerous

120' fine cavities due to removal of pyrite.

Quartz vein @ 111'

114'9"-115'3": breccia zone & quartz

119'-125'3": brecciated sediment, some quartz.

130' Bedding angles:

5° @ 128'	33° @ 116'
3° @ 144'6"	10° @ 143'
38° @ 148'	20° @ 146'
24° @ 166'	15°-25° @ 164'
35° @ 194'6"	28° @ 181'
23° @ 222'	18° @ 196'6"
23° @ 235'	32° @ 228'6"
12°-18° @ 247'6"	20° @ 241'
0°-10° from 249'-255'	20° @ 248'6"

140'

150' Fracture zones:

~132'-142'6"
144'6"-145'9"
182'-186'
189'-192'9"
195'-195'6"
198'-198'6"
200'-200'6"
205'-205'6"

160' 214'8"-215'
223'-224'
230'9"-231'

@ 196'6", microfault 35° to C.A, same sense as b.; some vein pyrite

249'-255': pinching + pulling apart of beds; microfaults.

170'

Pyrite more plentiful below 182' in patches + thin discontinuous veins, some crosscutting, some parallel to b.

180'

190'

SCANNED CORE

DRILL NO
TYPE
DRILLER
COMMENCED
COMPLETED

EXPLANATION

CASING IN HOLE DURING DRILLING

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS

HOLE No D.D.H. 2 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
							305 60 200 42
220'							540 50 210 16
230'							7" 40 120 4
240' @ 246', ½" F-Sandstone. Below 241', abundant pyrite, much parallel to b, some cross-cutting veins (¼"-½"). @ 251'6", 2" pyrite - quartz vein					SCRAPED CORE		45 50 100 6
250'							125 100 130 8
F-M-SANDSTONE: Little pyrite + quartz.							80 40 110 14
260' CARBONACEOUS SHALE: both contacts sheared & pyrite + quartz veining. b 15° @ 260'9"-262'9" ¼" pyrite vein // c.a 260'9"-262'9"							70 40 340 12
F-M-SANDSTONE:							
270'							85 30 330 6
CARBONACEOUS SHALE, SILTSTONE: Laminated, pyritic. 271'11"-272': sandstone; b.c. 10°. b. 15° @ 277'; 12° @ 280'.							
280' 271'-274': Very fractured, much pyrite in veins up to 1" // b.							
M-SANDSTONE: upper b.c. 15°.							50 30 280 20
CARBONACEOUS SHALE, SILTSTONE: Laminated, pyritic.							
290' Bedding angle: 10°-15° @ 288'. 20° @ 294'. 18° @ 305', 319'. 22° @ 326'.							60 20 250 6

DRILL NO. TYPE

DRILLER COMMENCED COMPLETED

CASING IN HOLE DURING DRILLING

EXPLANATION

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT: MARY RIVER RESERVE — REMARKS:

HOLE No: D.D.H. 2 — CO-ORDINATES: — R.L. GROUND:

LOCATION: — ANGLE FROM HORIZONTAL: — DIRECTION:

DESCRIPTION OF CORE	R.L. CASING / DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
315'-315'9" ; 317'-317'6" ; 319'6"-320': very broken						45 50 150 <2
310'						
moderate cleavage ~ 50°.						105 120 60 <2
320'						
						50 320 240 2
330'						
C-M- SANDSTONE: lower bedding contact 25°.						70 290 370 10
CARBONACEOUS SHALE, SILTSTONE: laminated; pyritic.						
340'						
Bedding ∠: 20° @ 340' 18° @ 344' 25° @ 360' 12° @ 375'						45 280 240 2
350'						
350'6" - 351'2": sandstone.						60 90 170 <2
360' 372'-374' ; 381'-383': very fractured						
369'-373': more carbonaceous, not laminated.						75 50 180 6
370'						
						125 110 120 6
380'						
SANDSTONE: graded.						530 870 1070 12
383'-391': "reverse grading" - m-c → F (down hole).						
390'						
b.c. 15°.						
391'-407': "reverse grading" - m-c → m → F (down hole).						20 90 750 8
black shale fragments in lower 9" due to disruption of shale band @ 407' by intrusion of overlying sandstone.						

SCRAPED CORE

Grading indicates bed right way up with bedding ~ 30° to west.

DRILL NO: — TYPE: — DRILLER: — COMMENCED: — COMPLETED:

EXPLANATION — CASING IN HOLE DURING DRILLING

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS

HOLE No D.D.M.R. CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL DIRECTION

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
@ 407' ½" disrupted shale band; orientation 22°							
407½"-410': F-ss → siltst → shale @ 407'8" (down hole) bot b.c. 15°							15 90 950 8
410'-413'6" F-ss (laminated siltstone (bit)) b.c 18°							
413'6"-435' M + C-ss F-ss (from 431') silicified in places, some granule veining upper b.c 15°							30 40 480 10
							35 70 1950 20
							15 20 650 10
							25 40 375 4
							1350 4
							35 60 1200 12
							40 60 4200 42
							50 250 1580 9
							40 120 640 9
							95 160 600 254

EXPLANATION

CASING IN HOLE DURING DRILLING

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT: MARY RIVER RESERVE — REMARKS:

HOLE No: D.D.H. 2 — CO-ORDINATES: — R.L. GROUND:

LOCATION: — ANGLE FROM HORIZONTAL: — DIRECTION:

DESCRIPTION OF CORE	R.L. CASING	DEPTH SIZE OF CORE	LOG	LIFT & CORE RECOVERY %	SAMPLES	REMARKS	ASSAYS
M- SANDSTONE (contin.)							
Quartz veins at:							
508'6" (1")							
515'6" (1½")							
521' (1")							
523'6" (½")							
526' (1")							
526'6" (1¼")							
526'9" (1")							
528' (1")							
520'				100%	SCRAPED CORE		30 15 190 <2
				50%			15 15 510 <2
				100%			10 20 260 <2
530' QUARTZ & brecciated sedimentary rocks: minor pyrite.							20 20 80 <2
HOLE ABANDONED							
540'							

DRILL NO.:
TYPE:
DRILLER:
COMMENCED:
COMPLETED:

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS SCALE 1" to 10'

HOLE N° 3 CO-ORDINATES SEE PLATE 3 R.L. GROUND

LOCATION 260' WEST OF GUBBERAH GOSSAN ANGLE FROM HORIZONTAL 45° DIRECTION 88° mag.

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES
SHALE with some F-SANDSTONE: mottled pink, white, brown.		14	
10' Core recovery too low, & core too fractured for subdivision.		13	
20'		20	
		13	
		40	
30'		20	
FAULT ZONE: brecciated sedimentary rocks (mainly shale) veined with quartz; hematite & limonite staining.			
40'		39	
SHALE, SILTSTONE, minor F-SANDSTONE:			
To 60'; reddish brown & brown.		43	
60'-174'; light grey, some pinkish grey.			
174'. Base of intense weathering.			
50' Below 174', dark grey to black.		63	
60'		17	
Very broken & fractured: 39'-45', 60'-76', 77'-81', 85'-91'			
70'		13	
Bedding: 40° @ 57°			
Laminated or thinly bedded: 45'-49', 52'-60'		50	
80'		44	
90'		40	

SANDSTONE {C - coarse, M - medium, F - fine}

SHALE, SILTSTONE

REFERENCES FAULT ZONE

All angles measured to core axis (C.A.)

b. bedding angle

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GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS SCALE 1" to 10'
HOLE N° 3 CO-ORDINATES R.L. GROUND
LOCATION ANGLE FROM HORIZONTAL 46° @ 100' DIRECTION

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES
SHALE - mainly massive, except thinly bedded or laminated in following sections: 164'-166', 168'-180', 194'-201'6". - these bands contain siltstone & F-sandstone; some of these have a porous nature due to the leaching out of pyrite.		100	
110' Complete removal of pyrite to 174' approx.; partial weathering of pyrite 174'-201'.		98	
120'		100	
130' Below 174' (base of intense weathering), sedimentary rocks are cabonaceous (graphitic) in places.		67	
		69	
140' Bedding ⊿'s: 45° @ 170'. 45° @ 180' 45° @ 195'		97	
150'		80	
Fissility well developed in laminated shales below zone of intense weathering; cleavage not as well developed in massive shales & in the weathered zone.		100	
160' 174'6": ½" quartz vein 20° to C.A.		75	
170' Very fractured: 127'-127'6" 142'-142'6" 149'-152' 174'6"-175' 195'6"-196'		100	
180'		76	
190'		28	
		95	

REFERENCES

LOGGED BY M.R. DALY

SHEET 2 OF 5 DRAWING N°

G71/214E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1" to 10'
HOLE N° 3 CO-ORDINATES R.L. GROUND
LOCATION ANGLE FROM HORIZONTAL 45°@200' DIRECTION

DESCRIPTION OF CORE	CORE RECOVERY %	SAMPLES Cu	Pb	Zn	Ag *
		values in p.p.m.			
M-C-SANDSTONE & some SILTSTONE & SHALE, particularly at top.	100				
210' Sandstone contains fine pyrite. Numerous thin quartz veins are pyritic.					
202'-202'3": laminated siltstone ; b. 50°-55°	100				
203'6"-205'6": laminated siltstone & thin F-sandstone; Some thin hematitic laminae : b. 40°.					
220' 206'-206'3": shale & siltstone.	75				
214'-214'3": shale ; b. 48°					
216'-216'3": shale, siltstone ; b. 50°					
222'6"-223': shale, siltstone, some F-sandstone.	100				
235'6"-236': laminated shale, siltstone ; b. 50°.					
230' 237'-237½": laminated shale, siltstone.					
252'-252'3": " shale ; b. 50°.					
253'9"-254': Siltstone.	100				
Main quartz veins:					
240' 217'-217'6": thin ramifying veinlets.					
246'6"-247'.					
247'6"-248'3"					
249'6"-249'9"					
271'3"-271'6". & pyrite	88				
Core very broken:	100				
195'3"-196'.					
250' 222'6"-223'.					
246'-246'6".	72				
248'-248'6".					
Sandstone appears slightly schistose.					
260' Grading m-c-sandstone → F up hole.	93				
	70				
270'	9				
	60				
LODE ZONE: Quartz, in places sedimentary inclusions, massive sulphides.	100				
	75	80	4875	21000	< 2
	100	115	4400	4625	2
280' 274'6"-277'3": quartz, inclusions sedimentary rocks, some patches pyrite & sphalerite.	100	30	4425	3175	< 2
277'3"-278'3": Shale/siltstone, dark grey; minute veins pyrite & sphalerite.	53	20	10700	17500	< 2
		265	950	4675	< 2
278'3"-281': altered sandstone; white with yellow mottling, some green patches; thin quartz veins, minor sphalerite.	90	25	1750	3100	< 2
281'-284'3": quartz, some included sandstone in bottom 3".	40				
290' 284'3"-287': altered sandstone; greyish white & yellow patches: thin quartz veins, very minor sulphide.	7	130	2250	2700	< 2
	80	90	3750	1950	< 2
287'-294': quartz, minor sulphide.	40	195	2675	6950	4
altered sandstone 290'3"-290'5"					
shale 290'8"-290'9"	75	50	2925	4325	< 2
sandstone, shale 291'-291'3"					
sandstone 293'4"-293'5".	45	60	3175	29500	2
294'-295'6": altered sandstone, minor shale.	50	20	1275	1200	< 2

REFERENCES
LODE ZONE
* RESULTS FROM SPLIT CORE

LOGGED BY M.R.D

SHEET 3 OF 5 DRAWING N°

671/2155

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1" to 10'
HOLE N° 3 CO-ORDINATES R.L. GROUND
LOCATION ANGLE FROM HORIZONTAL 45° @ 300' DIRECTION

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES Cu	Pb	Zn	Ag
			values in p.p.m.			
295'6"-307'3": quartz, some included sandstone 299'3"-300'; 301'-301'6". Patches of pyrite + sphalerite: sphalerite @ 300'9", 303', 304', 306', 307'.		67	40	6550	13500	42
			135	2775	60000	2
			140	2350	33250	2
307'3"-308'3": quartz; ~50% sulphides - mainly sphalerite with pyrite.		100	165	2600	58250	5
308'3"-312': massive sulphide, predominantly sphalerite, a little quartz.		50	255	110000	395000	22
312'-312'3": quartz, included altered sandstone (yellowish), some sphalerite.		100	310	3575	505000	23
312'3"-312'8": massive sphalerite, pyrite.			315	3175	340000	20
312'8"-314'9": quartz; ~60% sulphide, mostly sphalerite.		100	310	615	352500	10
314'9"-315'9": " , much brecciated shale, small patches sphalerite.			320	2900	297500	8
315'9"-317': quartz; ~50% sulphide, mostly sphalerite.		4	20	65	1500	42
317'-322': brecciated shale & quartz.		20	30	375	5700	<2
322'-330'4": quartz, little sulphide.		24	50	610	5175	<2
330'4"-332': " ; ~40% sulphide, predominantly sphalerite, much pyrite.						
332'-337'6": quartz, patches massive pyrite, some sphalerite (335'6"; 336').		50				
337'6"-356': quartz, much included sedimentary material; some sulphide, mainly pyrite with sphalerite.		100	270	1200	261000	18
		80	105	1800	20000	2
		80	85	1200	125000	3
main included sedimentary rocks:		93				
339'6"-340': sandstone		67	190	1750	14000	<2
342'3"-342'6": shale/siltstone, b.//C.A; quartz veins along bedding.		60	60	2250	6550	<2
344'-345': shale, siltstone. b. 40°.		25	90	750	45000	<2
347'5"-348': sandstone		48				
		100				
		47	75	1050	53500	<2
		50				
		73	185	1050	5100	<2
		27				
		30				
		20	35	230	2400	<2
		34				
Much of lode section very fractured, with low core recovery.		67				
SANDSTONE, minor siltstone, shale. Specks of pyrite throughout; a few thin quartz veins with some sulphide, mainly pyrite.		77	15	80	1700	<2
367'-367'6": quartz vein.		96				
373': siltstone/shale laminae. b. 45°.		100				
382'6"-382'9": " " " . b. 50°.						
388'-390': sandstone, siltstone, shale laminae. b. 50°		70				
396'-397': sandstone, siltstone, shale laminae grading into F-M-sandstone up hole.		95				
398'6"-399': siltstone, sandstone laminae grading into F-M-sandstone up hole.						
Core very broken: 356'6"-357'; 367'-367'6"; 384'-385'		86				
		90				
		100				

REFERENCES

LOGGED BY M.R.D.

SHEET 4 OF 5 DRAWING N°

G71/216F

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1" to 10'

HOLE N 3 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL 49° @ 400' DIRECTION

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES
401'6"-401'9": siltstone, shale.		94	
		94	
END OF HOLE			
410'			

REFERENCE

LOGGED BY M.R.D

SHEET 5 OF 5 DRAWING

G71/2175

D.D.H. 3 ANALYTICAL RESULTS

Interval feet (metres)	Cu	Pb	Zn	Cd	Ag	Sb (ppm)	Bi	Mo	Co	Ni	As	Sn
274 ½ 276 (83.5 - 84.1m)	80 160	4,875	21,000	176 88	D < 2	30 15	< 20	< 20	40 20	20	< 10	
276 ½ 278 (84.1 - 84.7m)	115 230	4,400	4,625	66 33	4 2	40 20			80 40	100	30	
278 ½ 280 (84.7 - 85.3m)	30 60	4,425	3,175	140 70	< 2	40 20			40 20	20	20	
280 ½ 282 (85.5 - 85.9m)	20 40	10,700	17,500	270 135		50 25			40 20	30	40	110
282 ½ 284 (85.9 - 86.5m)	265 530	950	4,675	90 45		50 25			< 10	< 10	10	
284 ½ 286 (86.5 - 87.1m)	25 50	1,750	3,100	74 37		20 10			< 10	< 10	20	
286 ½ 290 (87.1 - 88.4m)	130 260	2,250	2,700	132 33		40 10			< 10	20	20	
290 ½ 292 (88.4 - 89.0m)	90 180	3,750	1,950	98 49	< 2	30 15			< 10	20	10	
292 ½ 294 (89.0 - 89.6m)	195 390	2,675	6,950	96 48	8 4	40 20			< 10	20	20	
294 ½ 296 (89.6 - 90.2m)	50 100	2,925	4,325	304 152	< 2	20 10			30 15	30	< 10	
296 ½ 298 (90.2 - 90.8m)	60 120	3,175	29,500	310 155	4 2	< 10			40 20	20	15	100
298 ½ 300 (90.8 - 91.4m)	20 40	1,275	1,200	84 42	< 2	< 10			20 10	10	10	
300 ½ 302 (91.4 - 92.0m)	40 80	6,550	13,500	1240 620	< 2	40 20			40 20	30	40	
302 ½ 304 (92.0 - 92.6m)	135 270	2,775	60,000	1660 830	4 2	40 20			160 80	130	100	
304 ½ 306 (92.6 - 93.2m)	140 280	2,350	33,250	800 400	4 2	< 100			160 80	150	40	
306 ½ 308 (93.2 - 93.8m)	165 330	2,600	58,250	1420 710	10 5	20 10	< 20		240 120	260	50	100
308 ½ 310 (93.8 - 94.5m)	255 510	110,000	395,000	2960 1480	44 22	40 20	20		240 120	50	10	
310 ½ 312 (94.5 - 95.1m)	310 620	3,575	505,000	1980 990	46 23	40 20	< 20		300 150	50	20	100
312 ½ 314 (95.1 - 95.7m)	315 630	3,175	340,000	1900 950	40 20	40 20			220 110	70	50	
314 ½ 316 (95.7 - 96.3m)	310 620	615	352,500	1420 710	20 10	40 20			160 80	10	30	
316 ½ 317 (96.3 - 96.6m)	320 320	2,900	297,500	680 680	8 8	30 15			90 90	20	40	
317 ½ 322 (96.6 - 98.1m)	20 100	65	1,500	305 61	< 2	75 15			75 15	20	40	
322 ½ 323 (98.1 - 98.4m)	30 30	375	8,700	39 39	< 2	15 15			< 10	15	20	
323 ½ 330 (98.4 - 100.5m)	50 350	610	5,175	154 22	< 2	105 15			< 10	20	30	
330 ½ 332 (100.5 - 101.1m)	270 540	1,200	261,000	760 380	36 18	40 20	< 20	< 20	300 150	245	30	90

../2

Cont. D.D.H. 3 ANALYTICAL RESULTS

Interval feet (metres)	Cu	Pb	Zn	Cd	Ag	Sb	Bi	Mo	Co	Ni	As	Sn
						(ppm)						
332 ½ 334 (101.1 - 101.7m)	105 210	1,800	20,000	114 57	4 2	90 45	< 20	< 20	390 195	220	20	
334 ½ 336 (101.7 - 102.3m)	85 170	1,200	125,000	560 280	6 3	40 20		310 160		150	10	
336 ½ 338 (102.3 - 102.9m)	190 380	1,750	14,000	106 53	< 2	< 10		70 35		75	30	
338 ½ 340 (102.9 - 103.6m)	60 120	2,250	6,550	64 32		10		20 10		20	40	
340 ½ 342 (103.6 - 104.2m)	90 180	750	45,000	270 135		20 10		40 20		< 5	10	
342 ½ 346 (104.2 - 105.4m)	75 300	1,050	53,500	640 160		80 20		100 25		20	20	90
346 ½ 350 (105.4 - 106.7m)	185 140	1,050	5,100	100 25		60 15		60 15		< 5	60	
350 ½ 355 (106.7 - 108.2m)	35 175	230	2,400	115 23		75 15		50 10		< 5	10	
355 ½ 360 (108.2 - 109.7 m)	15 75	80	1,700	30 6	< 2	75 15	< 20	< 20	75 15	30	20	

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale: 1 DIV. to 0·2 METRES

HOLE N° 4 CO-ORDINATES SEE PLATE 3 R.L. GROUND

LOCATION 240' WEST of GUBBERAH GOSSAN ANGLE FROM HORIZONTAL 45° to 90° DIRECTION 124° mag. 52°@50m

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES
HOLE PRECOLLARED TO 38·63m.	NIL CORE		
SANDSTONE (m-c), minor thin SILTSTONE: light grey, some fawn colour. Core very broken in top section. No bedding intact. Minor quartz-pyrite veins.		30	
Siltstone present at approx. intervals: 38·63 - 39·73; 41·65 - 41·68; 42·00 - 42·10; 42·80 - 42·85; 44·73 - 44·80		21	
		22	
		94	
		44	
		7	
		27	
		57	
		100	
		87	
		80	
		25	
INTERBEDDED SANDSTONE (m-c) with laminated SILTSTONE/SHALE: Sandstone light grey-fawn; siltstone darker grey. Some sandstone beds graded C→F up hole. Minor thin quartz-pyrite veins. Laminated siltstone/shale, some F-sandstone at: 51·70-51·80, b. 35° : 51·85-51·95, b. 33° : 52·45-52·60, b. 30° : 52·80-53·20, b. 27° : 53·57-53·92, b. 30°.		100	
SANDSTONE (m-c, some f) with some SILTSTONE/SHALE: Sandstone light grey, siltstone dark grey. Sandstone commonly graded C→F up hole. Siltstone/shale, some F-sandst laminae at: 55·17 - 55·23, b. 25°		100	
55·95 - 56·05, b. disturbed, ~30°. 57·05 - 57·15, very broken, thin pyrite veins. 57·45 - 57·50, b. 32° 58·30 - 58·40, b. 28° 58·55 - 58·70, b. 40°		93	

SANDSTONE } C. Coarse M. Medium F. Fine
SILTSTONE/SHALE

REFERENCES All angles measured to Core Axis. b. bedding ∠.

LOGGED BY M.R.D

SHEET 1 OF 5

DRAWING N° G73/54E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE — REMARKS Scale, 1 Div. to 0·2 metres

HOLE N° 4 — CO-ORDINATES — R.L. GROUND

LOCATION — ANGLE FROM HORIZONTAL 53° @ 76 m DIRECTION 126·5°

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES p.p.m. * Cu	Pb	Zn	Ag
58·86 - 58·90, b. 38°. 60·40 - 60·47, b. disrupted. Cleavage poorly developed 45° - 70°, same sense as bedding.		93				
60		100	ALL SPLIT CORE SAMPLES			
200' SANDSTONE (c&m), very minor SILTSTONE/SHALE, F-SANDSTONE: Some sandstone bands very siliceous. Pyrite veins & patches common.		90				
62						
64		79				
SILTSTONE / F-SANDSTONE: Faint lamellae. b. 35° 5mm pyrite vein at 12°						
SANDSTONE (c-m): massive 66 light grey, some yellow-brown mottling Thin quartz veins; veins & patches of pyrite		100				
68						
QUARTZ - SPHALERITE VEIN: minor pyrite, patches of galena at 69·25m. Top contact irregular.		100	570	180	400,000	4
			3700	25,600	173,000	16
SANDSTONE (m): light grey, some yellow-brown mottling. 70 230' Thin sphalerite veins at top & pyrite at base.						
PYRITE - SPHALERITE - minor GALENA + QUARTZ: Top contact of vein 28°.			40	3470	83,000	2
			280	4360	369,000	6
SANDSTONE (m-c): light grey & yellow-brown patches						
SILTSTONE/SHALE, minor F-SANDSTONE: laminated, light grey to dark grey. 72 Thin quartz-pyrite veins. Main veins are: 5cm quartz at 71·30; 1cm sphalerite at 71·65; 10 cm. quartz at 71·75. Bedding disturbed in places & varies from: 30° @ 72·10, 0°-5° @ 72·58, 12° @ 73·00, 40° @ 78·70.		100	<10	370	2,000	22
74						
SANDSTONE (m-c), some SILTSTONE: light grey Thin veins & small patches of pyrite Small patch of sphalerite at 74·00		100				
76 250'						
		100				

REFERENCES

■ QUARTZ - SPHALERITE - PYRITE - GALENA MINERALISED ZONES.

LOGGED BY M.R.D

SHEET 2 OF 5

DRAWING N° G73/55E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1 Div. to 0.2m

HOLE N° 4 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL 54° @ 91m DIRECTION 127.5°

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES p.p.m. Cu	Pb	Zn	Ag
Thin veins + blebs sphalerite (~10%) 78.67 - 78.73		100				
260' QUARTZ - SPHALERITE, minor PYRITE: Top contact slightly sheared ~30°.		83	300	320	281,000	3
			140	50	202,000	42
80m MUDSTONE: 1 cm. quartz vein @ 79.94, 15°			45	280	2,070	42
QUARTZ - SPHALERITE - GALENA, minor chalcopyrite:			910	14,000	232,000	11
SANDSTONE (C+F):		100				
SILTSTONE/SHALE: very broken						
SANDSTONE (C+F):		30				
82m quartz veis 81.35 - 81.40.						
QUARTZ VEIN: very minor sulphide.		89				
		9	50	190	6,020	42
84m						
SANDSTONE (C+M)		82				
Patches of disrupted shale @ 85.90, 86.00.						
Siltstone lamellae bottom 1 cm. b ~10°						
86m Numerous thin quartz veins - with sphalerite @ 86.69, 86.84 + with pyrite @ 86.00.						
		100				
SPHALERITE - QUARTZ - PYRITE:			320	3480	466,000	11
			80	3,180	276,000	5
SANDSTONE (M+F): thin quartz + sphalerite vein @ 87.45						
88m SILTSTONE: b. 20° - 25°		77				
290' Sandstone 88.29 - 88.34						
SANDSTONE (M+C): core very broken		100				
Numerous thin quartz veins.						
Siltstone 89.16 - 89.33 b. 22°						
90m Thin quartz veins ± minor sphalerite ± pyrite @ 91.05, 91.15, 91.22, 92.00, 92.90, 92.98, 93.1, 93.45.		78				
1 cm sphalerite veins @ 92.45, 92.85, 93.53		100				
92m		83	50	140	20,200	3
			45	70	1,860	42
			45	80	7,860	42
		92	50	60	63,000	42
			15	70	131,000	42
			30	340	349,000	42
94m QUARTZ - SULPHIDE LODE:		19	260	3,630	129,000	6
310' Patches of brecciated sedimentary rocks which contain thin quartz veins ± some sulphide at:		15	60	80	30,400	42
94.93 - 94.95	102.95 - 103.01	10				
95.18 - 95.20	104.90 - 104.95					
95.70 - 95.75	106.35 - 106.48					
96m 96.41 - 96.45	108.27 - 108.30	12	20	50	22,900	42
96.47 - 96.55	108.50 - 108.60					
96.90 - 96.95	109.75 - 109.78					
97.87 - 98.25	109.90 - 110.00	94				
98.45 - 98.50	110.40 - 110.44		200	1200	246,000	10
98.60 - 98.73		63				
98.88 - 98.93						
99.22 - 99.81		47	40	80	6,160	42
100.02 - 100.05						
100.75 - 100.80		71				

REFERENCES

LOGGED BY M.R.D

SHEET 3 OF 5

DRAWING N° G73/56E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE — REMARKS Scale, 1 Div to 0.2 m.
HOLE N° 4 — CO-ORDINATES — R.L. GROUND
LOCATION — ANGLE FROM HORIZONTAL 54° @ 91.4m DIRECTION 128°

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES p.p.m. Cu	Pb	Zn	Ag
		47				
		73	<5	40	7,800	<2
		72				
the main sulphide zones (sphalerite-pyrite -		35				
galena - very minor chalcopyrite)		18	50	810	12,000	<2
100m		100	100			
		76				
330' 93.80 - 95.00		100	200	50	233,000	<2
96.55 - 97.00		100				
100.05 - 100.45		73				
106.45 - 106.89			20	90	13,700	<2
102m 106.59 - 106.75 - pyrite abundant.		11				
106.75 - 107.05			70	50	47,000	<2
107.20 - 109.65		22	15	20	3,540	<2
		16				
104m		6	370	120	750	<2
Sulphide minerals from 106.45 - 109.65		25	<5	140	2,200	<2
contained in a cellular network of thin		38				
106m quartz veins			40	610	35,500	<2
		80				
		66				
		100				
		100	140	3,260	165,000	5
		100				
		46				
		100				
		100				
108m		98	240	3,720	354,000	14
Sphalerite is dark brown in colour		97				
			130	10,000	229,000	11
		25				
360'			130	5,420	225,000	5
110m		47				
		71	90	850	48,200	2
		46	<5	250	7,400	<2
SANDSTONE (m, some c): light grey, massive.		73				
112m						
Core very fractured to 115.17.		56				
Many thin quartz veins & minor pyrite - main						
veins at:		35				
115.14 - 115.24						
115.67 - 115.68						
114m 116.26 - 116.27		46				
		100				
		84				
		29				
380'		100				
116m						
		84				
		100				
		88				

REFERENCES

LOGGED BY M.R.D.

SHEET 4 OF 5

DRAWING N° G73/57E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1 Div. to 0.2 m.

HOLE N 4 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL DIRECTION

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES
		88	
		60	
120m END OF HOLE		88	

REFERENCES

LOGGED BY M.R.D

SHEET 5 OF 5

DRAWING N° G73/58E

D.D.H. 4 ANALYTICAL RESULTS

Interval metres (feet)	Cu	Pb	Zn	Co	Ni	Cd	Sn	Ag	Au (dwt/ton)
68.73 - 69.03 (225.5' - 226.5')	570	180	400,000	150	<10	1,560		4	
69.03 - 69.33 (226.5' - 227.5')	3,700	25,600	173,000	60	<10	590	<50	16	<0.1
70.60 - 70.90 (231.6' - 232.6')	40	3,470	83,000	320	470	330		2	
70.90 - 71.05 (232.6' - 233')	280	4,360	368,000	218	270	870		6	
73.10 (239.8')	10	370	2,000	10	<10	15		<2	
79.20 - 79.50 (259.9' - 260.8')	300	320	281,000	96	10	870		3	
79.50 - 79.75 (260.8' - 261.7')	140	50	202,000	68	<10	670		<2	
80.10 (262.8')	<5	280	2,070	18	<10	20		<2	
80.20 - 80.50 (263' - 264')	910	14,000	232,000	77	<10	720		11	
82.65 - 84.35 (271.2' - 276.8')	50	190	6,020	<10	<10	15		<2	<0.1
86.96 - 87.26 (285.3' - 286.3')	320	3,480	466,000	142	20	1,220	<50	11	<0.1
87.26 - 87.41 (286.3' - 286.8')	60	5,250	276,000	248	360	690	<50	5	<0.1
92.00 - 92.30 (301.9' - 302.8')	50	140	20,200	25	10	60		3	
92.30 - 92.60 (302.8' - 303.8')	<5	70	1,800	10	<10	6		<2	
92.60 - 92.90 (303.8' - 304.8')	<5	80	7,860	15	<10	25		<2	
92.90 - 93.20 (304.8' - 305.8')	50	60	63,000	30	<10	215		<2	
93.20 - 93.50 (305.8' - 306.8')	15	70	131,000	15	<10	50		<2	
93.50 - 93.80 (306.8' - 307.8')	30 30	340 340	349,000	25 25	10	135 135		<2	0
93.80 - 94.70 (307.8' - 310.7')	754 260	10527 3,630	129,000	90 261	100	1392 480	<50	6 174	<0.1
94.70 - 95.60 (310.7' - 313.7'	180 60	240 80	30,400	10 30	<10	300 100		<2	0
95.60 - 96.50 (313.7' - 316.7')	60 20	150 50	22,900	10 30	<10	210 70		<2	0
96.50 - 97.40 (316.7' - 319.6')	580 200	3480 1,200	246,000	80 232	20	1987 685	50	10 29	0.5
97.40 - 98.30 (319.6' - 322.5')	116 40	232 80	6,160	<100	<10	58 20		<2	0
98.30 - 99.20 (322.5' - 325.5')	0 <5	120 40	7,800	10 30	<10	66 22		<2	0
99.20 - 100.10 (325.5' - 328.4')	145 50	2349 810	12,000	<100	<10	75.4 26		<2	0

../2

Cont. D.D.H. 4 ANALYTICAL RESULTS

Interval metres (feet)	Cu	Pb	Zn	Co	Ni	Cd	Sn	Ag	Au (dwt/ton)
100.10 - 101.00 (328.4' - 331.4')	600 200	50	233,000	225 75	<10	2340780	0	<2	
101 - 101.90 (331.4' - 334.3')	58 20	90	13,700	0 <10	<10	174 60	0	<2	
101.90 - 102.80 (334.3' - 337.3')	210 70	50	47,000	60 20	<10	495 165	0	<2	
102.80 - 103.70 (337.3' - 340.2')	44 15	20	3,540	0 <10	<10	29 10	0	<2	
103.70 - 104.60 (340.2' - 343.2')	990 330	120	750	0 <10	<10	15 5	0	<2	
104.60 - 105.50 (343.2' - 346.1')	0 <5	140	2,200	0 <10	<10	34.8 12	0	<2	
105.50 - 106.40 (346.1' - 349.1')	120 40	610	35,800	45 15	<10	306 102	0	<2	
106.40 - 107.30 (349.1' - 352.1')	420 140	3,260	168,000	300 100	60	1395 465	<50	15 5	<0.1
107.30 - 108.20 (352.1' - 355')	696 240	3,720	354,000	261 90	<10	1813 625	41	14	
108.20 - 109.10 (355' - 358')	390 130	10,000	229,000	420 140	200	1920 640	33	11	
109.10 - 110 (358' - 360.9')	377 130	5,420	225,000	203 70	<10	1871 645	14.5	5	
110 - 110.90 (360.9' - 363.9')	270 90	850	48,200	45 15	<10	330 110	6	2	
110.90 - 111.20 (363.9' - 364.8')	0 <5	250	7,400	45 50	85	7.2 8	0	<2	

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1" to 10'
HOLE No D.D.H. 5 CO-ORDINATES SEE PLATE 3 R.L. GROUND
LOCATION 270' WEST OF GUBBERAH GOSSAN ANGLE FROM HORIZONTAL 45° DIRECTION 124° MAG

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES
130'			
CARBONACEOUS SILTSTONE / SHALE: Buff coloured to 162'6" - base of intense leaching. Below 162'6", black, very carbonaceous.		6	
150' Core peppered with fine holes which occur along planes ~45° to C.A (bedding or cleavage) - holes due to leaching of pyrite.		22	
160' Bedding not visible; moderate cleavage ~45°.		19	
		100	
170'		53	
180'		23	
190' Numerous very thin pyrite veins mostly along cleavage (or bedding?) eg. 45° @ 215'.		100	
		27	
		65	
200' 1/4"-1/2" pyrite veins @ 220'3", 225'10"; 228'10".		95	
		90	
		90	
210'		35	
		100	
		68	

REFERENCES

LOGGED BY M.R.D.

SHEET 1 OF 3

DRAWING No G73/59E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1" to 10'

HOLE No 5 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL 50° DIRECTION 127° @ 300'

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES	Cu	Pb	Zn	Ag p.p.m *
		87	* ALL SPLIT CORE SAMPLES				
		100					
230'		100					
		68					
		100					
240'		56					
		100		165	8600	585	< 2
		90					
250' QUARTZ VEIN : minor brecciated shale		35					
CARBONACEOUS SILTSTONE / SHALE.		15					
Much vein quartz, core very broken.		31					
		10					
		100					
		87		110	1620	225	< 2
		63					
260'		100					
QUARTZ VEIN		19					
CARBONACEOUS SILTSTONE / SHALE : b. 35° @ 264'6", 30° @ 265'6". Quartz veining bottom 6" with pyrite + sphalerite		100					
QUARTZ VEIN		50		105	2230	1975	< 2
270' C-SANDSTONE : much quartz veining, minor pyrite.		60		120	360	615	
QUARTZ VEIN : some brecciated sandstone, minor pyrite		36					
C-SANDSTONE : thin quartz veinlets		48		60	1100	820	
QUARTZ - BRECCIATED SANDSTONE - PYRITE - MINOR SPHALERITE - GALENA		64		110	5200	5200	
C-SANDSTONE : thin quartz veins		100		40	2660	3460	< 2
QUARTZ - BRECCIATED SILTSTONE / SHALE - PYRITE -		100		40	450	31,250	16
280' MINOR SPHALERITE - GALENA.		88		30	580	9330	16
276'-278'6": massive pyrite, minor sphalerite + galena		83		80	6140	81,200	19
		91		40	1720	220	< 2
280'-280'6": Main sphalerite zone.		58		25	2150	380	
		55		35	2400	1600	
290' 295'-295'3", 296'3"-296'6": laminated siltstone/shale, b. 11 C.A.		69		15	460	420	
		67		60	705	775	
298'-298'9", 299'8"-299'10": patches of F-sediment.		42		25	860	330	
		67		20	8200	5890	
		90		10	1530	1615	
		100					
300'		100		185	1215	17,150	
		54		10	7065	5375	< 2
CARBONACEOUS SILTSTONE / SHALE : laminated.		100					
		100					
Moderate slate cleavage (10°-40°) to 324', very		71					
310' well developed below this where coincides		100					
with bedding (0°-10°)							
Core fairly broken, sheared, cleavage		100					
surfaces polished, some slickensided.							
possible drag folding @ 302'3", 330'6".							

REFERENCES

LOGGED BY M.R.D

SHEET 2 OF 3

DRAWING No G73/60E

GEOLOGICAL LOG OF DRILL HOLE

PROJECT MARY RIVER RESERVE REMARKS Scale 1" to 10'

HOLE N° 5 CO-ORDINATES R.L. GROUND

LOCATION ANGLE FROM HORIZONTAL 50° DIRECTION 147° @ 360'

DESCRIPTION OF CORE	LOG	CORE RECOVERY %	SAMPLES P.P.M Cu	Pb	Zn	Ag
			65	210	495	<2
numerous pyrite veinlets, mostly along cleavage + bedding planes many thin quartz veins		61				
		38				
330' bedding angles:		10m				
15° @ 210'		82				
25° @ 320'		95				
5° @ 337', 355'		63				
340' 10° @ 351'			160	70	210	<2
0°-5° @ 358'-360'.		25				
350'		79				
		95				
360' END OF HOLE						

REFERENCES

LOGGED BY M.R.D

SHEET 3 OF 3 DRAWING G73/61E

D.D.H. 5 ANALYTICAL RESULTS

Interval feet (metres	Cu	Pb	Zn	Ag (ppm)	Cd	Co	Ni	Sn	Au (dwt/ton)
245 (74.6m)	165	8,600	585	< 2	20	<10	<10		
256 (78.0m)	110	1,620	225	<2	25	<10	<10		
320 (97.5m)	65	210	495	< 2	12	15	25		
340 (103.6m)	160	70	210	<2	4	20	20		
266 - 268 (81.0 - 81.6m)	105	2,230	1,975	<2	22	<10	<10		
268 - 270 (81.6 - 82.3m)	120	360	615	<2	10	<10	15		
270 - 272 (82.3 - 82.9m)	60	1,100	820	<2	20	<10	<10		
272 - 274 (82.9 - 83.5m)	110	5,200	5,200	<2	35	25	55		
274 - 276 (83.5 - 84.1m)	40	2,660	3,460	<2	35	<10	<10		
276 - 278 (84.1 - 84.7m)	40	450	31,250	16	175	213	320	<50	<0.1
278 - 280 (84.7 - 85.3m)	30	580	9,330	16	63	260	365	<50	<0.1
280 - 282 (85.3 - 85.9m)	80	6,140	81,200	19	280	80	110	<50	<0.1
282 - 284 (85.9 - 86.5m)	40	1,720	220	<2	12	80	130		
284 - 286 (86.5 - 87.1m)	25	2,150	380	<2	12	40	85		
286 - 288 (87.1 - 87.7m)	35	2,400	1,600	<2	17	10	30		
288 - 290 (87.7 - 88.3m)	15	460	420	<2	3	<10	<10		
290 - 292 (88.3 - 88.9m)	60	705	775	<2	12	<10	10		
292 - 294 (88.9 - 89.5m)	25	860	330	<2	5	<10	<10		
294 - 296 (89.5 - 90.1m)	20	8,200	5,890	<2	55	40	115		
296 - 298 (90.1 - 90.7m)	10	1,530	1,615	<2	30	<10	<10		
298 - 300 (90.7 - 91.9m)	185	1,215	17,150	<2	75	15	80		
300 - 302 (91.4 - 92.0m)	10	7,065	5,375	2	50	<10	<10		

APPENDIX II

MINERALOGICAL DESCRIPTIONS FOR SELECTED

CORE SPECIMENS

D.D.H. 1. 377' (114.8 m)

Minerals present: Pyrite, sphalerite, sericite, muscovite, quartz, chlorite.

The rock consists largely of black carbonaceous material containing small grains of quartz and muscovite, with very fine-grained masses of sericite and chlorite. The rock has a strongly sheared appearance and contains thin veins of pyrite parallel to the schistosity. In addition some pyrite is present in small irregular fractured masses, very minor grains of sphalerite are scattered throughout.

The rock is a strongly carbonaceous siltstone.

D.D.H. 1. 452' (137.8m)

Identical with D.D.H. 3 390' except slightly more sheared.

D.D.H. 1 507' (154.5 m)

The rock consists of a coarse grained mixture of quartz and dolomite, both ranging up to 5 mm across. The quartz has a strong undulose extinction and is zoned with fine grained inclusions. Zones of inclusions commonly transgress crystal boundaries in both minerals and in places almost perfect rhombs of inclusions are present in quartz grains. It would appear from these rhombs that an earlier formed dolomite has been recrystallized with the preservation of the original crystal form by the inclusions.

Sphalerite is the principal opaque mineral, it forms irregular areas in dolomite and contains within it small quantities of galena and stannite.

D.D.H. 3. 201' (64.3 m)

The rock is similar to D.D.H. 1. 377' except that it is slightly less sheared and contains bands of relatively carbon-free siltstone.

D.D.H. 3. 279' (85.0 m)

Minerals present: Sphalerite, galena, pyrite, talc, quartz.

Sphalerite is the principal sulphide mineral; it forms a vein about 3 mm thick traversing the section.

Galena and pyrite are also present in the vein, galena forming about 30% and pyrite 10% of the vein mineralization. Both sphalerite and galena show well-developed gel textures in places where the minerals appear to have grown into open spaces in the vein.

The country rock consists of mainly sericite, randomly oriented and colourless chlorite with the vein filling of comb-like quartz, coarse grainsized, with grains averaging 2.0 mm across. This quartz is characterized by having a marked zoning by very fine-grained inclusions

../3

of an indeterminate nature. Both sericite and chlorite in places are replacing a lath-like mineral, none of which remains, but which, by its form, could have been feldspar. This mineral must have formed at least 10% of the original rock and from the generally uniformly fine grained matrix the rock could have had a porphyritic texture. Some epidote is present as small irregular grains. The rock has been extensively altered, apparently by the solution responsible for the mineralization, and it is impossible to determine the original rock type, except to say that it could have been a porphyry.

D.D.H. 3. 310' (94.5 m)

The section consists almost entirely of sphalerite containing minor pyrite, quartz and very minor marcasite.

D.D.H. 3. 331' (100.8 m)

Minerals present: Sphalerite, pyrite, stannite, marcasite, quartz.

Sphalerite forms about 40% of the rock, as large crystalline aggregates containing small irregular bodies of stannite.

Pyrite and marcasite comprise roughly 20% of the section, pyrite forming large subhedral crystals up to 10 mm in length. Throughout the section the pyrite has extensively altered to marcasite which appears as a very fine grained, highly anisotropic aggregate of crystals, for the most part exhibiting gel textures.

The gangue mineral is quartz which forms a coarsely crystalline aggregate.

D.D.H. 3. 390' (118.9 m)

Minerals present: Quartz, biotite, chlorite, carbonaceous material, kaolin.

The rock consists essentially of poorly sorted clastic quartz grains ranging up to 1.5 mm across set in a matrix of chlorite, biotite, muscovite, and some carbonaceous material.

Kaolin could not be identified unambiguously in thin section, but the hand specimen showed small specks of what appeared to be kaolin resulting from the weathering of feldspar grains, which range up to 2 mm across; no unaltered feldspar remains in the rock.

The matrix, which has a marked flow-like texture, contains nests of bleached biotite, partly altering to chlorite in places, chlorite, kaolin, and large (2.5 mm) segregations of carbonaceous material.

The rock is greywacke which has been sheared to some extent.

Pyrite is the only opaque mineral, and this mineral is only present within the clastic quartz grains.

../4

Mary River D.D.H. 4. 79.5 metres (260.8')

Minerals present: Quartz, sphalerite, pyrite, marcasite.

Sphalerite is the principal ore mineral; it is brecciated and contains small inclusions (1 micron) of pyrite and marcasite along crystal boundaries. The only gangue mineral is quartz which has the same texture as section D.D.H. 1. 106.5, 108.7.

Mary River D.D.H. 4. 106.5 metres (349.4')

Minerals present: Quartz, sericite sphalerite, galena, pyrite.

Sphalerite is the principal ore mineral, forming a brecciated mass of fragments up to 1 cm across, which have the same evidence of movement as those from 108.7 metres. Galena forms small irregular masses in the sphalerite, and accounts for about 5% of the ore minerals. Pyrite is a very minor constituent, forming one small mass of subhedral crystals 0.5 mm long in the quartz gangue.

The quartz gangue is similar to that in the section D.D.H. 4, 108.7, but this section differs in that no carbonate is present and a small fragment of sericite schist is present in the quartz.

D.D.H. 4. 108.7 metres (356.6')

Minerals present: Quartz, calcium carbonate (?dolomite), sphalerite, pyrite, galena, pyrrhotite, marcasite.

The section consists mainly of sphalerite and pyrite in a matrix of quartz and calcium carbonate (probably dolomite). The sphalerite is brecciated, the largest fragments measuring 1 cm across, and are extensively fractured in places. Pyrite, which forms about 30% of the ore minerals present occurs as a porous gel textured material (Melnikovite) and as aggregates of small cubes. Galena fills spaces between pyrite and sphalerite, and accounts for about 5% of the ore minerals.

Marcasite and pyrrhotite are minor constituents in the ore; pyrrhotite forms very small irregular bodies in both pyrite and sphalerite, and marcasite appears to be forming irregular crystalline masses by alteration of pyrite.

In thin section some of the sphalerite is seen to be zoned in bands of lighter and darker brown, yet between fragments of this mineral the zoning is not continuous, indicating that is has been moved after fracturing, possibly during the introduction of the quartz-dolomite gangue.

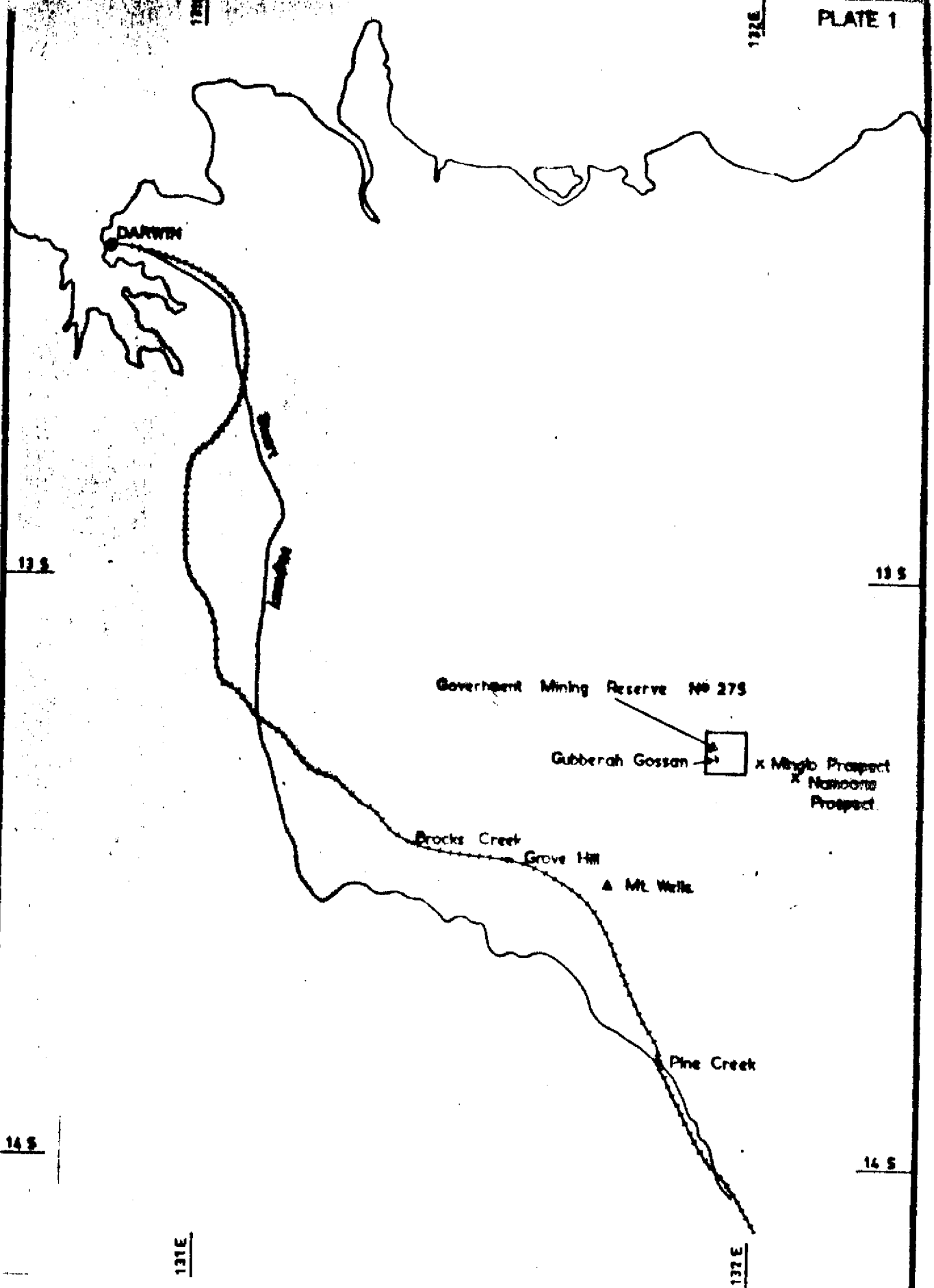
A particular point of interest is that pyrite is associated only with carbonate, it is quite clearly replacing carbonate areas, flowing along interfaces of dolomite and quartz and growing inwards into the dolomite along a front marked by the formation of small perfectly formed cubes. In addition, at very high magnifications pyrite can be seen forming thin rims around most of the sphalerite fragments. It is fairly obvious that this mineral has been introduced at a late stage in the ore formation.

../5

Quartz is generally coarsely crystalline, and commonly contains zoned areas consisting of patches of dusty inclusions which could not be identified. Extinction is sharp, except where grains consist of radiating crystalline aggregates, indicating introduction after fracturing of the ore minerals.

The impression gained from the textures in this section is that sphalerite has been sheared and brecciated; following the shearing, quartz and dolomite have been introduced; and finally pyrite has replaced carbonate and has formed overgrowths on sphalerite fragments.

PLATE 1



LOCALITY MAP
MARY RIVER GOVERNMENT RESERVE NO. 275

SCALE

0 5 10 20 30 miles

COMPILED BY RESIDENT GEOLOGICAL SECTION
DRAWN BY MINES BRANCH DRAUGHTING OFFICE, DARWIN, OCTOBER, 1968

G74/22E

MARY RIVER RESERVE Nº 275
GEOLOGY AND DIAMOND DRILL HOLE LOCATIONS

Scale 1:4,800

400 0 400 800 1200 1600 feet

N

Vein quartz, minor hematite and gossanous patches

See Plate 3

D.D.H.4

Sandstone rubble

GOSSAN

Brecciated sedimentary rocks; quartz, hematite and limonite replacement; gossanous patches

GUBBERAH

D.D.H.3

D.D.H.5

D.D.H.2

Vein quartz

Sandstone rubble

Sandstone rubble

Sandstone, quartz rubble

Sandstone rubble

some gossanous patches

q-h, gossanous

D.D.H.1

Black soil plain

Black soil plain

Sandstone rubble

Quartz rubble and laterite pebbles

Old Mingela Road

spotted slate (andalusite - cordierite)

Quartz rubble

Quartz rubble

Sandstone rubble

Fc

Fc

Fc

LEGEND

- Ferricrete
- Sandstone
- Slate
- Carbonaceous, pyritic, siltstone/shale – extrapolated from diamond drill holes
- Outcrop boundary
- Fault, with dip (q, quartz infilling; q-h, quartz-hematite infilling; P, pegmatite vein)
- Shear zone (q, quartz infilling; q-h, quartz-hematite infilling)
- Inferred fault
- Strike and dip of beds
- Bedding trend, dip and plunge of minor folds
- Syncline
- Strike and dip of cleavage
- Strike and dip of joints (Gubberah Gossan)
- Ridge
- Edge of rise
- Stream
- Track
- Fence
- Diamond drill hole, direction and angle of depression

Compiled by N.T. Mineral Survey (Reference No. N.T.G.S. Record 1975/1)
Drawn by Mines Section Drafting Office, Townsville, September 1974

G74/23B

Plate 2

REFERENCE

- Gubberah Gossan: quartz – hematite – brecciated sedimentary rocks, with gossanous patches
- Quartz vein
- Siltstone/Shale
- Sandstone, generally medium to coarse grained
- Sandstone, conglomeratic
- Outcrop boundary
- Strike and dip of strata
- Shear zone
- Topographic contour – height in feet
- Spot height in feet
- Watercourse
- Track
- E120 N14 — Geophysical grid peg
- DDH3 491 45° — Diamond drill hole location, indicating R.L. of collar in feet, drilling direction and depression
- A — A — Line of Section (see Plate 8)

Gossanous

Silicified

Minor Siltstone

Minor Siltstone

Carbonaceous, Pyritic Shale/Siltstone (extrapolated from DDH 3 and 5)

Carbonaceous, Pyritic Shale/Siltstone (extrapolated from DDH 2)

Rubble

DDH4 448 45°

DDH3 491 45°

DDH5 45°

DDH2 449 45°

E124 N17

E124 N16

E116 N14

E120 N14

BLACK SOIL PLAIN

Magnetic North

N

MARY RIVER RESERVE NO. 275

SURFACE GEOLOGY AND DRILL HOLE LOCATIONS, GUBBERAH GOSSAN

SCALE 1 : 500

50 0 50 100 150 Feet

Geophysical peg E120, E14 used as arbitrary datum (500 feet)

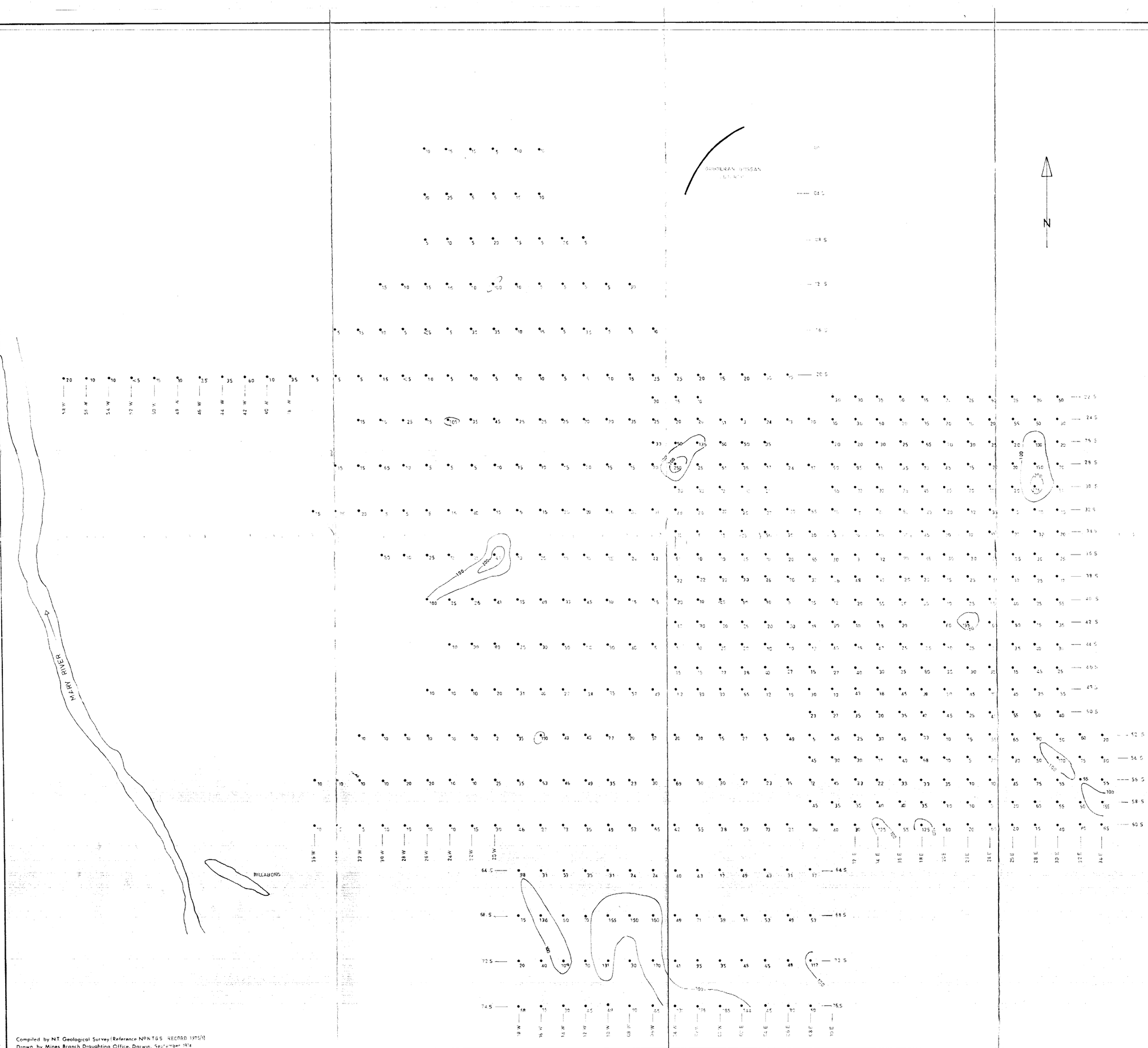
Plane table survey by J.W. Shields and M.R. Daly

Compiled by N.T. Geological Survey (Reference No° N.T.G.S. Record 1974/51)

Drawn by Mines Branch Draughting Office, Darwin, September 1974

G74/24B

PLATE 4



MARY RIVER RESERVE N°275

(NORTHERN TERRITORY)

COPPER GEOCHEMICAL CONTOURS

SCALE

0 400 800 feet

Copper drill hole with copper assay in p.p.m.

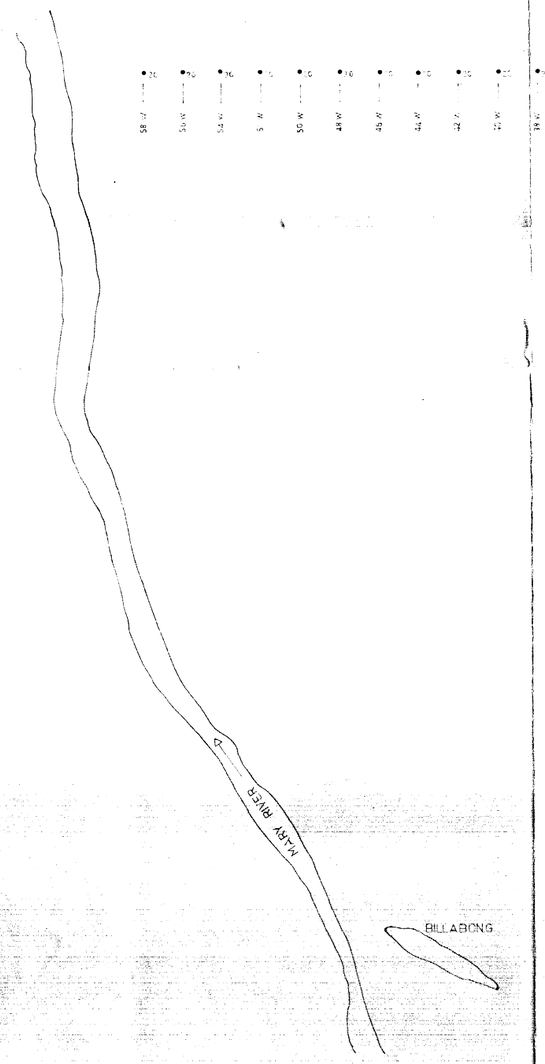
Geochemical contour with value in p.p.m.

CONTOURED AT 100 p.p.m. 200 p.p.m.

Compiled by N.T. Geological Survey (Reference N.T.G.S. RECORD 1975/1)
Drawn by Mines Branch Draughting Office, Darwin, September 1974

G 74/25 B

PLATE 5



MARY RIVER RESERVE N°275

NORTHERN TERRITORY

LEAD GEOCHEMICAL CONTOURS

SCALE

0 400' 800 feet

LEGEND

Auger drill hole with Lead assay in p.p.m.

Geochemical contours in ppm.

Contoured at:

200 p.p.m.
400 p.p.m.
800 p.p.m.
1600 p.p.m.
3200 p.p.m.
5400 p.p.m.

Compiled by N.T. Geological Survey (Reference N° N.T.G.S. RECORD 1974/43)
Drawn by Mines Branch Draughting Office, Darwin, October 1974

G74/26B

MARY RIVER RESERVE N°275

NORTHERN TERRITORY

ZINC GEOCHEMICAL CONTOURS

SCALE

0 400 800 feet

LEGEND

- •4400 Auger hole with lead assay in p.p.m.
- —600— Geochemical contour in p.p.m.

Contoured at:

300 p.p.m.
600 p.p.m.
1200 p.p.m.
2400p.p.m.

CUBBERAH GOSSAN OUTCROP

N

MARY RIVER

BILLABONG

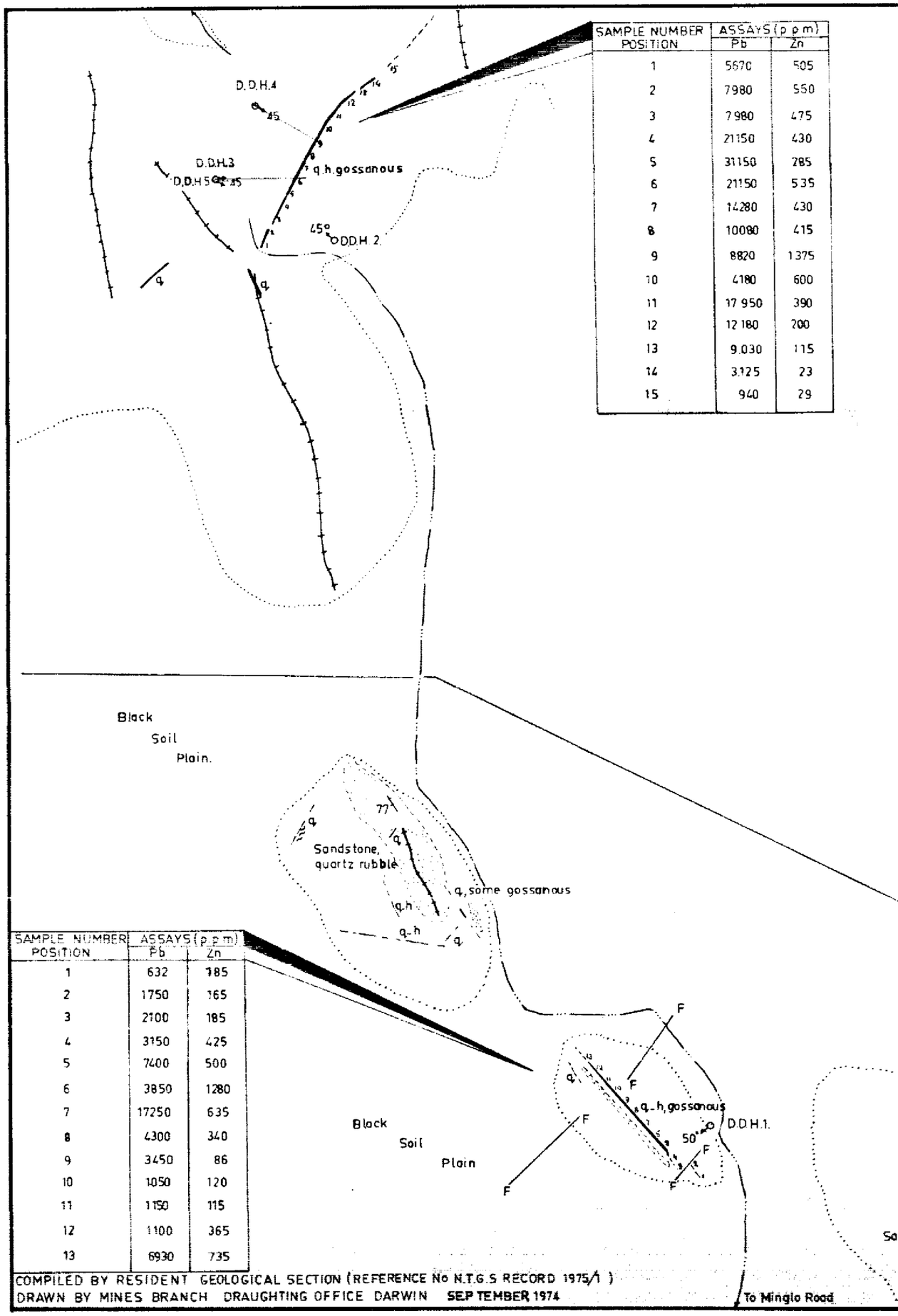
Compiled by N.T. Geological Survey (Reference N° N.T.G.S. RECORD 1975/1)
Drawn by Mines Branch Draughting Office, Darwin, October 1974

G74/27B

PLATE 7

SAMPLE NUMBER POSITION	ASSAYS (p.p.m) Pb	Zn
1	5670	505
2	7980	550
3	7980	475
4	21150	430
5	31150	285
6	21150	535
7	14280	430
8	10080	415
9	8820	1375
10	4180	600
11	17 950	390
12	12 180	200
13	9.030	115
14	3.125	23
15	940	29

SAMPLE NUMBER POSITION	ASSAYS (p.p.m) Pb	Zn
1	632	185
2	1750	165
3	2100	185
4	3150	425
5	7400	500
6	3850	1280
7	17250	635
8	4300	340
9	3450	86
10	1050	120
11	1150	115
12	1100	365
13	6930	735



LEGEND

- SANDSTONE.
- OUTCROP BOUNDARY
- SHEAR ZONE
- FAULT q=QUARTZ INFILLING q-h=QUARTZ HEMATITE INFILLING
- 77 STIKE AND DIP OF BEDS
- F——F INFERRED FAULT
- RIDGE
- EDGE OF SCREE
- STREAM
- TRACK
- FENCE
- ⟶45° DIAMOND DRILL HOLE COLLAR POSITION, DEPRESSION

MARY RIVER

(NORTHERN TERRITORY)

GOSSAN SAMPLE POSITIONS AND ASSAY RESULTS

GEOLOGY INCOMPLETE.

SCALE
0 400 800
FEET

COMPILED BY RESIDENT GEOLOGICAL SECTION (REFERENCE No N.T.G.S RECORD 1975/1)
DRAWN BY MINES BRANCH DRAUGHTING OFFICE DARWIN SEPTEMBER 1974

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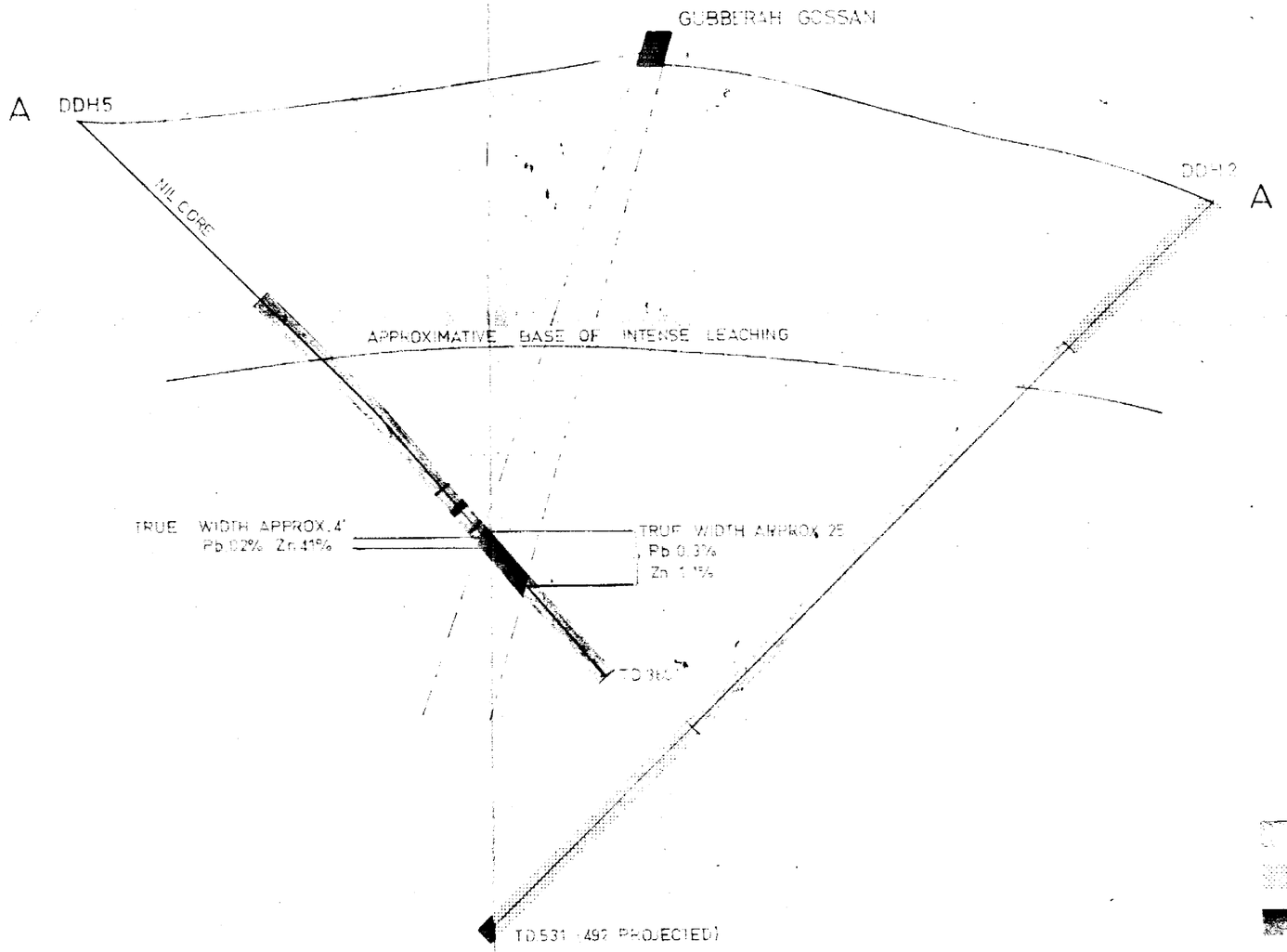

MARY RIVER RESERVE N°275
CROSS SECTION A A

Carbonaceous, pyritic shale/siltstone

Sandstone

Main lode subsidiary quartz veins

SCALE 1:600

Compiled by N.T. Geological Survey (Reference N°N.T.G.S. RECORD 1975/1)
Drawn by Mines Branch Draughting Office, Darwin, October 1974.

G 74/29C

PLATE 11

MARY RIVER RESERVE
Nº 275

AEROMAGNETIC CONTOUR MAP
WITH LOCATIONS OF
GEOPHYSICAL GRIDS

SCALE : 1:16000 (approx.)

0 1/4 1/2 3/4 1 Miles

0 1/2 1 Km

MARY RIVER WEST

GUBBERAH GOSSAN

GUBBERAH SOUTH WEST

GUBBERAH SOUTH

MINGLO No. 1

MINGLO No. 2

MINGLO MINE

Mary River

Approximate boundary of Government Reserve

Compiled by N.T. Geological Survey (Reference Nº GS 1975/1)
Drawn by Mines Branch Draughting Office, Darwin, September 1974

G 74/32 A