DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

R/B 79/23

THE BRUKUNGA PYRITE MINE - DRILL HOLE ANALYSES AND MINE DEVELOPMENT PLAN INVENTORY

By

J. DREXEL

Rept.Bk.No. 79/23
G.S. No. 6142
D.M. No. 760/51

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept.Bk.No. 79/23
G.S. No. 6142
D.M. No. 760/51

THE BRUKUNGA PYRITE MINE - DRILL HOLE ANALYSES AND MINE DEVELOPMENT PLAN INVENTORY

SUMMARY

The B.H.P. Co. Ltd. (Whyalla) has recently provided unpublished data on the now inoperative Brukunga Pyrite Mine. This report is designed as an inventory of these data to provide access to the mine development plans, as well as analytical data on two diamond drill holes cored from the Nairne Pyrite Member.

INTRODUCTION

The Brukunga Pyrite Mine, 35 km east of Adelaide (Fig. 1), was operated in 1955-1972 to provide sulphur for sulphuric acid manufacture during years of sulphur shortage. Quarrying was carried out by Nairne Pyrite Ltd., a company sponsored by the State government, and which comprised several Adelaide-based fertilizer companies, with the B.H.P. Co. Ltd. as managing agents.

Pyrite was quarried from Shepard's Hill, immediately west of Brukunga township, but ore reserves outlined by Mason (1966) extend semi-continuously for 1 km north and 8 km south of the workings (Downer Hill and Ironstone Ridge respectively - Fig. 2). Host rock to the mineralisation is the Nairne Pyrite Member, a syngenetic sulphide horizon, with a strike length of 32 km, at the base of the Brukunga Formation within the Kanmantoo Trough (Thomson, 1975).

As a result of a request by the South Australian Department of Mines and Energy, the B.H.P. Co. Ltd. (Whyalla geological office) has kindly forwarded mine development plans, geological cross-sections, and analytical data of two diamond drill holes.

These holes, 108 and 109, are located on Figure 2, and the analytical data are detailed in Tables 1 and 2. The geological logs for the holes (see Appendix) have been reprinted from Mason (1966). The development plans etc., now housed in Envelope Cylinder 3376 (Vols 1 and 2) within the department's record system, are referenced in Table 3. All data have been kept in the original British Imperial system units.

5.2.79

JD:GU

J. DREXEL

GEOLOGIST

REFERENCES

Mason, M.G., 1966. Report on the Nairne Pyrite Deposit, Brukunga. S. Aust. Dept. Mines and Energy report 66/119 (unpublished).

Thomson, B.P., 1975. Kanmantoo Trough-regional geology and comments on mineralisation. In: Knight, C.L. (Ed.), Economic Geology of Australia and Papua New Guinea, 1, Metals. Australas. Inst. Min. Metall., Melbourne, pp. 253-254.

TABLE 1. NAIRNE PYRITES LTD. - BRUKUNGA D.D.H. 108

SEMI-QUANTITATIVE SPECTROGRAPHIC ANALYSIS (P.P.M.)

DEPTH (ft.)	Cu	Pb	Zn	Co	Ni	Ag	Au	Cr	V
73 - 80	200	600	1,500	80	100	2.5	<3	300	200
80 - 85	200	600	2,000	100	100	2.	"	300	300
85 - 90	200	600	2,000	100	100	2.5	"	300	300
90 - 95	250	1,000	1,000	100	100	5.	"	300	300
95 -100	250	800	1,200	100	100	3.	"	300	300
100 -105	250	1,200	2,000	60	60	4.	"	300	200
105 -110	250	800	1,200	80	80	3.	"	200	300
110 -115	200	500	1,000	80	100	2.5	"	300	300
115 -120	250	1,200	2,000	60	80	4.	"	200	200
120 -125	250	1,200	1,500	80	100	5.	"	200	200
125 -130	600	800	600	100	120	3.	"	300	300
130 -133	500	1,000	1,000	100	120	4.	"	300	300
133 -140	800	1,500	300	100	150	4.	"	300	300
140 -144	600	1,000	150	100	150	3.	"	500	400
144 -151	300	1,000	1,200	150	200	5.	"	500	400
151 -155	150	600	400	80	120	2.	"	500	400
155 -160	200	600	1,200	120	150	5.	"	300	400
160 -165	200	600	1,000	100	80	5.	"	300	300
165 -170	200	1,000	1,000	100	150	6.	"	300	300
170 -175	200	2,000	2,000	70	60	6.	"	300	200
175 -180	200	600	1,000	70	60	3.	"	200	200
180 -185	200	1,200	1,200	100	100	5.	"	300	300
185 -190	250	2,000	800	120	100	8.	"	200	400
190 -195	250	800	800	200	250	8.	"	500	500
195 -197	250	600	600	150	250	5.	"	200	400
197 -200	300	2,500	1,500	150	250	8.	"	200	300
200 -204	300	1,500	1,500	250	300	8.	"	400	500
204 -206	200	800	3,000	100	200	6.	"	400	500
206 -210	250	800	800	80	150	4.	"	300	200
210 -215	250	2,500	2,000	70	100	10.	"	300	150
215 -221	250	1,000	600	100	200	4.	"	300	300
221 -224	250	500	1,200	60	120	3.	"	300	300
224 -230	200	200	150	200	250	1.	"	400	500
230 -235	200	200	150	100	100	1.	"	400	200
235 -238	200	300	40	80	100	1.2	"	400	300

AMDEL REPORT AN 832/68

TABLE 2. NAIRNE PYRITES LTD. - BRUKUNGA D.D.H. 109

SEMI-QUANTITATIVE SPECTROGRAPHIC ANALYSIS (P.P.M.)

DEPTH (ft.)	Cu	Pb	Zn	Co	Ni	Ag	Au	Cr	V
108 -110	300	1,500	1,500	150	200	4.	<3	400	300
110 -115	150	2,000	1,500	100	250	4.	"	500	300
115 -120	300	2,000	1,500	100	200	6.	"	100	250
120 -125	300	2,000	2,000	80	150	6.	"	100	250
125 -130	250	2,500	1,200	60	60	6.	"	300	250
130 -135	300	2,500	1,500	60	50	6.	"	200	400
135 -140	300	2,000	1,500	60	50	4.	"	200	250
140 -145	300	2,000	2,000	60	60	4.	"	200	200
145 -150	300	2,000	1,500	80	80	6.	"	200	250
150 -155	300	2,000	2,000	60	150	6.	"	200	400
155 -160	250	1,000	1,500	50	50	4.	"	250	150
160 -165	250	2,000	1,500	60	100	6.	"	300	200
165 -170	250	2,000	600	60	100	4.	"	300	200
170 -173	250	2,000	1,500	60	200	6.	"	300	200
187 -190	250	500	500	50	150	3.	"	300	300
190 -195	250	500	1,500	200	250	2.	"	500	600
195 -200	250	2,000	800	100	100	6.	"	300	500
200 -205	250	800	600	60	100	4.	"	300	500
205 -210	250	600	600	60	80	3.	"	300	200
210 -215	250	200	600	60	100	1.	"	300	400
215 -220	250	300	150	80	120	2.	"	100	400
220 -224	250	300	400	120	120	1.5	"	300	500
224 -231	250	800	1,000	120	150	2.5	"	300	400
231 -235	250	600	1,000	120	200	4.	"	300	400
235 -240	200	200	500	30	60	1.	"	300	150
240 -245	300	300	600	80	150	1.5	"	400	500
245 -250	300	200	400	80	200	1.5	"	200	250
250 -255	250	100	1,000	120	250	0.5	"	300	500
255 -257	250	100	30	50	80	0.3	"	600	500
257 -260	250	80	30	120	120	0.3	"	600	500
260 -265	250	60	60	120	150	0.3	"	600	500
265 -270	200	300	60	60	150	1.2	"	600	700
270 -275	200	200	150	80	150	0.5	"	800	700
275 -280	300	500	500	200	200	0.6	"	600	600

AMDEL REPORT AN 567/68

TABLE 3: INVENTORY OF PLANS: ENV CYLINDER 3376

ENVELOPE PLAN NO.	PLAN TITLE	DATE	COMMENTS
1	Geological Cross-Sections-Timmins Hill	Nov'67	
2	" " " " "	"	Cross-Sections
3	" " " " "	"	Located in
4	" " " " "	"	RB 66/119
5	Interpreted Geology-Downer Hill		+Transparency
6	Outcrop Geology - Downer Hill		+Transparency
7	Outcrop Location Plan - Downer Hill	March'68	
8	Bore Holes & I.P. Anomalies - Mt. Beevor Shear Zone	Nov'69	
9-15	V, Cr, Ni, As, Pb, Co, Zn analyses on DDH 13 & 14 - Downer Hill		
16-22	Cr, Ni, Zn, V, Pb, As, Cu analyses - Mt. Beevor shear zone	Oct'68	
23	I.P. Grid - Mt. Beevor Shear zone		
24-25	Rough Magnetic & I.P. Presentation - Mt. Beevor shear zone		
26	Drill Hole locations - Ironstone Ridge	1.3.51	
27	Tailings Dam Area - Brukunga	6.3.51	
28	Quarry Plan - Nairne		
29	Face Plan - Shepard's Hill	1.7.72	
30	Face Plan - Little & Grassfire Hills	1.7.72	
31-35	Lode Cross-Sections-4700N to 5500S	13.3.52 to 1.7.72	
36	Economics - Timmins Hill		
37	Pyrite : Pyrrhotite Calculation Graph	13.2.52	
38	Pyrite : Pyrrhotite : excess Iron Graph - Longitudinal Section - Nairne Lode		
39-40	Pyrite : Pyrrhotite Transverse Graphs	Feb'52	

APPENDIX

NAIRNE PYRITE MEMBER

LOGS OF DIAMOND DRILL HOLES 108 AND 109

(REPRINTED FROM RB 66/119)

PROJECT NAIRNE PYRITES PTY LTD. **LOG OF DIAMOND DRILL HOLE**

HOLE NO 108

830/67

SECTION 4410 HUNDRED KANMANTOO

FEATURE SOUTH END HILL

CO-ORDINATES 4250 S 588 E R.L. Surface 1112·0 FT

ANGLE FROM HORIZONTAL 30° at surface R.L. of 1112·4 FT

LOCATION BRUKUNGA

DIRECTION 270° GRID 260° TRUE Datum Pt. Adelaide M.S.L.

DESCRIPTION OF CORE	WEATHERING SW MW HW CW	CORE SIZE, DEPTH IN FT	LOG	FRACTURE LOG 4 16 64	STRUCTURES JOINTS, VEINS, SEAMS, SHEARED ZONES, CRUSHED ZONES	LIFT CORE LOSS % 5 50	WATER LEVEL DATE	CASING DRILL WATER LOSS % 0-100	PRIMARY STRUCTURES
Red clay. High plasticity. 5% Sand. Rock fragments		NO CORE	NXC					NX	
GRANOFELS – Brown to grey medium grained 60% quartz, 10% mica rest feldspar. Few % sphene		NO CORE			Incipient schistocity. Planar, 70° to axis of core. Joints – open Hematite and clay. Coated planar. 50% parallel to schistocity. Rest various angles 45° to axis of core. 1–3 mm. wide 0·4 ft. apart.				No visible layering
		NO CORE		10					
GRANOFELS – Grey fine grained. 50% quartz. 10% mica. 3% sphene Rest weathered feldspar.					Alignment of mica to give incipient schistocity. Joints open 70° to axis of core Hematite coated 1 to 3 mm. wide 0·2 ft. apart. Closed hematite filled 1 mm. wide mainly 70° to axis of core 0·1 ft. apart.				
		NO CORE		30					
Gradational boundary									
GRANOFELS – Grey medium to fine grained 50% quartz, 10% biotite, 3% sphene Rest Feldspar			NMS		Joints, open planar Hematite coated. 60% 70° to axis of core. Rest 25° to axis of core. 0·5 ft apart.			NOT TESTED	
				40					
Gradational boundary									
GRANOFELS–CALCSILICATE white. Fine grained. 60% plagioclase. 10% quartz Rest tremolite actinolite				50	Joints – planar, open near horizontal 1·0 ft. apart. Hematite coated.				
GNEISS – red brown, fine grained. Metasilt 50%. Quartz 5% hematite after Fe sulphides 5% mica. Rest weathered Feldspar.				60	Joints wavy associated with altered zones containing Kaolin clay. 60% near horizontal. Rest 20° to axis of core. 0·4 ft apart.				Layering vague to nonexistent 70° to axis of core. planar.
GNEISS – AUGEN – Grey to brown. 12% cavities 1–2 mm. wide after Fe sulphides. 40% quartz, 10% mica. Rest Kaolin and weathered Feldspar.				NOT APPLICABLE	Partings 0·5 ft. apart.				Layering very good, planar up to 3 mm. wide. 75° to axis of core
Limit of Oxidation		NO CORE		70					
As above. Grey, 12% sulphides. 20% Augens 2–4 mm. diam. commonly associated with coarse grained sulphides. Sulphides tending to occur in ill defined bands up to 3 mm. wide.					Partings Vivianite coated 1–2 mm. wide, open, planar 1·5 ft. apart. Joints Kaolin clay filled. Vivianite coated below 83 ft. 1–4 mm. wide Mainly 45° to axis of core 2·0 ft. apart.				
				80					
			BX	90				BX	
				100					

CAMBRIAN – KANMANTOO GROUP
NAIRNE PYRITE FORMATION
Assays for Fe and S
NO. 1 ORE ZONE
① ② ③ ④ ⑤

WEATHERING

FR – Fresh
SW – Slightly weathered
MW – Moderately ..
HW – Highly ..
CW – Completely ..

FRACTURE LOG

1 4 16 64
12 3 3/4 3/16

Natural fractures per foot of core
Equivalent diameter

CAMBRIAN
KANMANTOO GROUP
NAIRNE PYRITE MEMBER

LEGEND

Quartz, biotite Granofels
SCHIST
GNEISS-METASILT
GRANOFELS CALCSILICATE

×××Breccia Zone
Major Joint
Bedding Trend
Altered Zone

METALLIC MINERALS SECTION

DRILL No. 15
TYPE E 1000
DRILLER ASCHMONEIT
START 30TH. JUNE '67
FINISH 11TH. JULY '67

LOGGED BY M. MASON
DATE 24TH. JULY '67
TRACED R.A.J.
CHECKED L.V.W.

SHEET 1 OF 3

S6076

LOG OF DIAMOND DRILL HOLE

4410 KANMANTOO

42505 588 E 1112-0

LOCATION BRUKUNGA 270° Grid 260° True 1112-4

Pt. Adelaide M.S.L.

NO. 1 ORE ZONE

STRUCTURAL SAMPLE

GRANOFELS-AMPHIBOLITE Green-grey Medium grained. 10% Fe sulphides as irregular blebs up to 10mm dia. 40% actinolite. 10% tremolite, rest plagioclase.

Grodational boundary

GNEISS-Grey-fine grained. 10% Fe sulphides 70% as bands 0·5 to 3mm wide 5 to 20 mm. apart. 60% quartz. 3% mica rest Feldspar.

GRANOFELS-METASILT-Grey-fine grained. 60% quartz. 2% phlogopite. Rest Feldspar. 2% Fe sulphides.

GNEISS-Grey fine grained. 11% Fe sulphides. 60% as medium grained bands up to 4 mm. wide 5 to 20 mm. apart. 50% Quartz 7% phlogopite. Rest Feldspar.

NO. 2 ORE ZONE

Sulphide content decreases to 9%

CAMBRIAN - KANMANTOO GROUP - NAIRNE PYRITE MEMBER - WASTE ZONE

BX

Joints - planar, open, Vivianite coated 1-2 mm wide 60° to axis of core. 1·0 ft apart.

Joints planar, open Vivianite coated 1-2 mm wide. Near horizontal 2·0 ft. apart. One joint 30° to axis of core. Faulting sulphide bands 15mm.

Joints as above but 45° to axis of core.

Joints planar, open. Vivianite coated. 1-3 mm. wide. Parallel to layering. 2·0 ft apart. Closed, planar Vivianite filled. 3·0 ft. apart 2-4 mm. wide. 20 to 45° to axis of core. Faulting of sulphide bands, movement 5 to 10 mm.

NOT TESTED

Layering very distinct planar .70° to axis of core.

Layering very good 70° to axis of core. Planar. Parallel to sulphide bands except in few areas.

1 10 140 150 160 170 180 190 200

WEATHERING

FR Fresh
SW Slightly weathered
MW Moderately
HW Highly
CW Completely

CAMBRIAN KANMANTOO GROUP NAIRNE PYRITE MEMBER

LEGEND

AMPHIBOLITE
SCHIST
GNEISS-METASILT
GRANOFELS CALCSILICATE

Breccia Zone
Major Joint
Bedding Trend
Altered Zone

METALLIC MINERALS SECTION

SCALE 15
TYPE E 1000
LOGGED BY M. MASON
CO. ASHMONEIT
START 30th. June '67
FINISH 11th. July '67
DATE 25th. July '67
TRACED R.A.J.
CHECKED L.V.W.

SHEET 2 of 3 S6076 a

LOG OF DIAMOND DRILL HOLE

4410

4250 S 588 E

25° at 200 ft

270° Grid 260° True

1112 C
1112 4
M.S.L. Pt Adelaide

CAMBRIAN – KANMANTOO GROUP
NAIRNE PYRITE MEMBER

NO. 2 ORE ZONE

Bands of sulphide 0.3 ft. apart cross cutting bedding

METASILT – less 3% Fe Sulphides

Sulphide bands 1.0 ft. apart.

GNEISS – METASILT – Grey fine grained. 3% Fe sulphides. Few sulphide bands.

SCHIST – fine grained. Pale grey. 3% fine disseminated Fe sulphides. 40% quartz, 15% phlogopite. Rest plagioclase.

GRANOFELS – AMPHIBOLITE – Green, medium grained. 40% actinolite. 10% hornblende 10% tremolite. 1% sphene Rest plagioclase

SCHIST – Grey purple tint. Fine grained. 30% quartz, 25% phlogopite 10% sphene. Rest feldspar

NO CORE

GRANOFELS – as above but 10% mica

NO CORE

GRANOFELS – as above

BX

Schistocity good, parallel to layering. Partings 0.1 ft. apart planar. Vivianite coated.

Cross cutting joints absent.

No joints.

Joints, planar open, 1-2 m.m wide. vivianite coated. Main set 55° to axis of core 0.5 ft. apart. Few at other angles. Some closed.

Partings planar. 0.5 ft. apart. Crenulation or schistocity parallel to strike ie. perpendicular to axis of core.

Schistocity 55° to axis of core.

schistocity porallel to layering.

schistocity 75° to axis of core.

NOT TESTED

Layering wavy, axial. Planes of isoclinal folds 1.0 ft. apart.

Layering very good 80° to axis of core.

Layering good. Planar, 10–15° to axis of core.

Layering good 50° to axis of core. Up to 2 mm. wide. planar, parallel to schistocity. Below 250 ft. cross cutting. Isoclinal fold axes 0.5 ft. apart. 30% shows no folding.

END OF HOLE 277.5 FT.

WEATHERING

CAMBRIAN
KANMANTOO GROUP
NAIRNE PYRITE MEMBER

LEGEND
AMPHIBOLITE
SCHIST
GNEISS-METASILT
GRANOFELS CALCSILICATE

Breccia Zone
Major Joint
Bedding Trend
Altered Zone

METALLIC MINERALS

15
E 1000
ASCHMONEIT
30th. June '67
11th. July '67

M MASON
28th July '67
R.A.J.
L.Y.W.

3 - 3

S6076 b

NAIRNE PYRITES PTY LTD

LOG OF DIAMOND DRILL HOLE

DD 68

SECTION 4414 — KANMANTOO

COORDINATES 4000S 45E (67-513 Plan) — 977·6

ANGLE FROM HORIZONTAL 40° at surface — 978·0

FEATURE IRONSTONE RIDGE — DIRECTION 254° True — Arbitrary (67-53

LOCATION BRUKUNGA (4 MILES SOUTH)

PRIVATE STRUCTURES

GRANOFELS – Grey brown medium grained 40% quartz. 10% biotite Rest weathered feld spar partly Kaolin.	NO CORE	NXC	Joints Open planar, parallel to schistocity 1·0 ft. apart. Kaolin filled, altered zones 3 to 7 mm. wide
CALCSILICATE LAYER			
SCHIST – Khaki – medium and finegrained 35% muscovite biotite 40% quartz. Rest weathered feldspar.	NO CORE		Joints – parallel to schistocity Occuring in sections 1·0 ft. wide, joints 2 mm. wide 0·05 inches apart. In other areas 0·3 ft. apart. Fe oxide coated.
GRANOFELS – Grey brown. Medium grained. 40% quartz. 15% muscovite biotite. Rest weathered feldspar			Joint – planar – originally coarse grained sulphides etc 5mm. wide. Joints – Open, planar, various attitudes, crosscutting, incipient schistocity but greater than 70° to axis of core. Several sections closely spaced, near horizontal joints.
GNEISS – originally 7% sulphides			
GRANOFELS – CALCSILICATE – white finegrained 80% actinolite 15% tremolite, 10% phlogopite. Rest weathered plagioclase.			
GNEISS originally 5% Fe sulphides.			
GRANOFELS – CALCSILICATE – grey white medium grained 2% Fe oxides. 50% plagioclase. 15% quartz. Rest tremolite actinolite.		NMLC	Joints, open, planar 1-3 mm. wide. Near 90° to axis of core 0·5 ft. apart.
GRANOFELS – Grey brown. Fine grained. 45% quartz. 20% muscovite biotite Rest weathered feldspar.			Joints, open, planar 1-3 mm. wide. Parallel to incipient schistocity 0·2 ft. apart. One well jointed section.
GRANOFELS – medium grained Pale brown to white. 50% quartz. 10% biotite. Rest weathered feldspar and Kaolin.	NO CORE		Joints open planar 1-3 mm. wide. Uncoated. 90° to axis of core. 0·5 ft. apart except in closely spaced sections where 0·05 ft. apart.
SCHIST			
GRANOFELS – medium grey, pale brown to grey. 30% quartz 5% sphene. 15% biotite. Rest feldspar.			Joints, planar, open, parallel to alignment of mica. 1-3 mm. wide. Average 0·3 ft. apart.
GRANOFELS – CALCSILICATE white medium grained 40% plagioclase. 15% quartz. 5% biotite Rest tremolite.			Joints, open, planar 1-3 mm. wide 60% 90° to axis of core. 10 ft. apart. Rest 45° to axis of core. Few closed joints 30° to axis of core. One major joint 10° to axis of core.

NOT DETERMINED

	Incipient schistocity 70° to axis of core
	Schistocity planar 75° to axis of core.
	Incipient schistocity 75° to axis of core planar.
	Vague layering planar 80° to axis of core
	Layering in gneiss wavy 10° to axis of core.
	Incipient schistocity 10° to axis of core, planar.
	Biotite in clumps orientated in plane 80° to axis of core.

CAMBRIAN — KANMANTOO GROUP — NAIRNE PYRITE MEMBER

WEATHERING
FR – Fresh
SW – Slightly weathered
MW – Moderately
HW – High
CW – Completely

FRACTURE LOG
1 4 16 64 – Natural fractures per foot of core
12 3 ¾ ¼ – Equivalent diameter

CAMBRIAN — KANMANTOO GROUP — NAIRNE PYRITE MEMBER

LEGEND
- Quartz biotite Granofels.
- SCHIST
- GNEISS METASILT
- GRANOFELS CALCSILICATE
- *** Breccia Zone
- Major Joint
- Bedding Trend
- Altered Zone.

METALLIC MINERALS SECTION

DRILL No 24 — LOGGED BY M. MASON
TYPE E 1000
DRILLER KRUZE — DATE 27 July '67
START 11 July '67 — TRACED R.A.J.
FINISH 20 July '67 — CHECKED E.V.W.

SHEET 1 OF 3 — DRG No S6088

610/68

LOG OF DIAMOND DRILL HOLE

FROM: NAIRNE PYRITES PTY LTD

SECTION 4414 HUNDRED KANMANTOO

CO-ORDINATES 4000S 45E (67-513 Plan) R.L. Surface 977·6 F

FEATURE IRONSTONE RIDGE ANGLE FROM HORIZONTAL 31° at 10ft. R.L. Collar 978·0 F

LOCATION BRUKUNGA (4 MILES SOUTH) DIRECTION 254° True Datum Arbitrary (67-513)

DESCRIPTION OF CORE	WEATHERING	CORE SIZE / DEPTH	FRACTURE LOG (1 4 16 64)	STRUCTURE (JOINTS, VEINS, SEAMS, SHEARED ZONES, CRUSHED ZONES)	LIFT CORE LOSS %	WATER LEVEL	CASING & WATER LOSS	PRIMARY STRUCTURE
					5 50	DATE	0-100	

CAMBRIAN = KANMANTOO GROUP
NAIRNE PYRITE NO 1 ORE ZONE

As below

GNEISS - brown fine grained 20% mica 40% quartz. 3% hematite after sulphides Rest weathered feldspar

Limit of oxidation

① GNEISS - METASILT - light grey fine grained 14% coarse grained Fe sulphides and as fine grains within the mass. 70% of Fe sulphides in bands parallel to layering 0·5 to 5 mm. wide 3 to 20 mm. apart. 65% quartz 5% phlogopite Rest feldspar.

Few coarse grains galena and spholerite in pyrite bands.

Below 122 ft. sulphide bands thicker (5 mm.) and further apart. (40 to 60 mm) Average 13% Fe sulphides. Below 135 ft. 11% Fe sulphides. Bands 0·2 to 0·3 ft. apart - Decreases to 10% at 152 ft.

Layering good. Partings 0·05 ft. apart Hematite coated. Incipient schistocity 90° to axis of core. Relaxation joints.

Layering - very distinct Average 80 to 85° to axis of core, planar, up to 3mm. wide - discontinuous pyrite lenses.

Movement along the coarse pyrite bands is shown by faulted joints. Movement is only of a few mm. and is variable in direction. Compare with deformation in lower sulphide bed. Partings - along sulphide lenses. Vivianite coated 1 to 1mm wide. 0·5 ft. apart. Cuspate closely spaced at 110, 114 and 115 ft. Kaolin coated near limit of oxidation. Joints - closed 5 to 15° to axis of core. Vivianite filled. Mainly less 0·5 mm. wide and from 5 mm. to 2·0 ft. in length. Often 2 to 10 mm. apart. Less common and mainly of at least 1·0 ft. length below 135 ft.

NMLC

BX

BX

GRANOFELS - CALCSILICATE white fine grained. 3% fine grained Fe sulphides randomly scattered. 5% brown phlogopite. 60% plagioclase. 10% quartz. Rest tremolite, actinolite.

Vague layering due to alignment of mica 80° to axis of core. Partings 1·0 ft. apart planar. Vivianite coated. Open. Joints closed 0·5 to 1 mm. wide planar Vivianite. Filled 5 to 15° to axis of core. 2·0 ft. apart. Faulted to minor extent 1 mm. movement.

Gradational boundary

NO 2 ORE ZONE — A WASTE ZONE

GNEISS - METASILT - light grey fine grained. 7% Fe sulphides 10% below 194 ft. Mainly as coarse grained bands 2 to 5 mm. wide. 1·0 ft. apart.

0·2 ft. apart below 194 ft. 60% quartz. 3% phlogopite. Rest plagioclase. 10% of coarse o sulphides is phyrrotite

Layering very good planar. 80 to 85° to axis of core. Up to 3 mm wide. Partings 0·5 to 1·0 ft. apart Open Vivianite coated. Joints. Closed 10 to 20° to axis of core. Vivianite filled. Faulted by sulphide.

WEATHERING

FF — Fresh
SW — Slightly weathered
MW — Moderately ··
HW — Highly ··
CW — Completely ··

FRACTURE LOG

1 4 16 64 — Natural fractures per foot of core
1/2 3 3/4 3/8 — Equivalent diameter

CAMBRIAN — KANMANTOO GROUP — NAIRNE PYRITE MEMBER

LEGEND

- Quartz, biotite Granofels
- SCHIST
- GNEISS METASILT
- GRANOFELS CALCSILICATE
- Breccia Zone
- Major Joint
- Bedding Trend
- Altered Zone.

METALLIC MINERALS SECTION

DRILL No 24
TYPE E1000
DRILLER KRUZE
START 11 July '67
FINISH 20 July '67

LOGGED BY M. MACPHAIL
DATE 24 July 67
TRACED E.F.J.
CHECKED L.V.

SHEET 2 OF 3 DRG No S6088

NAIRNE PYRITES P/L LTD

LOG OF DIAMOND DRILL HOLE

610/68

SECT. N. 4414 — MODEL KANMANTOO

COORD. NATE. 40005 45E (67-513 Plan) — E. 9776

ANGLE FROM HORIZONTAL 35° at 400 Ft. — E. 9780

FEATURE IRONSTONE RIDGE — DIRECTION 254° True — Datum Arbitrary (67-513)

LOCATION BRUKUNGA (4 MILES SOUTH)

PRIMARY STRUCTURE

Bands up to 4 mm. movement In some areas sulphide bands show crosscutting relationship to bedding.

Sulphide content decreases to 5% Bands irregular 0·5 to 1·0 ft apart.

Layering becoming wavy in par

GNEISS – white and grey fine grained 25% brown green phlogopite. 40% quartz. 8% Fe sulphides Bands of coarse grained sulphides wavy to irregular 0·4 ft apart. 5 mm. wide.

Partings planar parallel to incipient schistocity. Open. Vivianite coated. 80° to axis of core. 1·5 ft. apart. [Compare this type of deformation to that above]

Few closed joints. Vivianite filled. Various attitudes.

Layering very good. Highly folded. Isoclinal fold axes 0·1 ft. apart. 80° to axis of core

Sulphide content decreasing to 40%

GNEISS – METASILT – Grey fine grained. 2% Fe sulphides. 55% quartz. 10% phlogopite. Rest feldspar.

Partings – planar, open. Vivianite coated 1–2 mm. wide. 1·0 ft. apart.

Joints.
Open. 60° to axis of core. planar. Vivianite coated. 5·0 ft. apart.
Closed. 1 mm. wide. Vivianite filled. Generally planar but irregular due to minor faulting.
Two main sets.
Near 90° to axis of core.
10–20° to axis of core.
The latter is more often finely faulted by the former.

Layering. 70 to 75° to axis of cor
Planar up 5 mm. in width.

GRANOFELS – Grey purple tint. Fine grained 40% quartz. 15% biotite. 5% sphene Rest feldspar.

Joints, open, planar. Vivianite coated – near 90° to axis of core. 0·5 ft. apart. Few sections closely spaced. 45° to axis of core, 3·0 ft apart. Closed irregular 30 to 40° to axis of core 1·0 ft. apart.

Few sectior show layeri 10 to 15° to axis of cor

END OF HOLE 302·0 FT.

ZONE — FIRST SPLIT CORE — BX

WEATHERING
Fresh
Slightly weathered
Moderately "
Highly "
Completely "

FRACTURE LOG
Natural fractures per foot of core
Equivalent diameter

CAMBRIAN — KANMANTOO GROUP — NAIRNE PYRITE MEMBER

LEGEND
Quartz, biotite Granofels.
SCHIST
GNEISS METASILT
GRANOFELS CALCSILICATE
Breccia Zone
Major Joint
Bedding Trend
Altered Zone

METALLIC MINERALS SECTION

DRILL No. 24
TYPE E1000
DRILLER KRUZE
START 11 July '67
FINISH 20 July '67

LOGGED BY M. MASON
DATE 27 July '67
TRACED R.A.J.
CHECKED L.V.W.

SHEET 3 OF 3 — S6088 b