62/138

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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1962/138

CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC INVESTIGATIONS DURING THE HALF YEAR, JANUARY- JUNE, 1962.

Compiled by

S.C. Goadby.

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

"CHEMICAL, PETROGRAPHIC AND MINERAGRAPHIC INVESTIGATIONS DURING THE HALF YEAR, JANUARY - JUNE, 1962.

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Records 1962/138

INTRODUCTION

This record is composed of minor reports completed by the chemical, petrographic and mineragraphic sections of the Geological Laboratory, Bureau of Mineral Resources during the period January 1962 to June 1962. The reports are in chronological order and each report gives its date of completion and relevant file number above the heading.

The officers responsible for the work in this record are A.D. Haldane, (Senior Chemist), W.M.B. Roberts (A/Senior Geologist), J.R. Beevers (Chemist Grade III), S.C. Goadby (Chemist Grade III), K.R. Walker, (Geologist Grade III), R. Bryan (Geologist Grade II), S. Baker (Chemist Grade II), L.V. Bastian (Geologist Grade I) G.J.G. Greaves (Geologist Grade I), E.J. Howard (Chemist Grade I), J.M. Rhodes (Geologist Grade I), N.W. le Roux (Chemist Grade I)

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RECORDS OF THE GEOLOGICAL BRANCH LABORATORY
JANUARY - JUNE 1962.

Compiled by
S.C. Goadby

Records 1962/138

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PART II(cont.)

Report No.1

84NT/10A
10th January, 1962.

ESTIMATION OF PHOSPHATE ON TWO SAMPLES FROM THE RUM JUNGLE AREA

by

S. Baker

Two samples of a phosphatic rock obtained through W. Patterson, Territory Enterprise Pty.Ltd., have been analysed with the following results ;-

Sample No.	Percent P_2O_5
1¼ miles S.W. Stapleton Homestead	26.7%
from "Bill Patterson's" northern locality (150' x 80')	32.6%

Report No.2.

84NT/10A
10th January, 1962.

ESTIMATION OF PHOSPHATE ON AUGER CUTTINGS FROM GEOLSEC AREA 2

by

S. Baker

Following are further results on the estimation of phosphate on Auger Cuttings submitted by C.E. Pritchard:

Sample No.	Percent P_2O_5
F26E/15N/ 2-4	19.9
F26E/15N/ 6-10	18.9
F26E/15N/18-22	12.4
F26E/15N/24-28	11.6
F26E/15N/35-37	15.2
F26E/14½N 6-10	32.1
F26E/14½N18-22	32.4
F26E/14½N24-28	34.6
F26E/14½N36-40	35.7
F26E/14½N42-46	27.7
F26E/14½N58 (sludge)	23.7

Report No.3 45 NT/1

26th January, 1962.

NITROGEN NITRATE ESTIMATION OF BORE WATER SAMPLES FROM THE ALICE SPRINGS AREA

by

S. Baker

Following are results for the determination of Nitrogen-Nitrate, conductivity and pH on 12 water samples and complete analysis on a bore water sample from Horse Shoe Bend No.1 taken on 2.10.61.

Sample	Nitrogen-Nitrate (N) (p.p.m.)	Conductivity (micro mho/cm)	pH
Harper Springs Station	50	1430	7.2
Gorey Bore	12	1270	7.2
Kooldunda Well	50	1620	8.1
Rombergs Bore	<2	2100	7.1
Heavitree Gap Bore 59	3	1370	7.5
Stuart Well	50	1830	8.3
Cabbage Well	20	1550	8.2
Almurba Well	10	550	7.9
5 Mile Well	8	1100	7.7
Woolla Downs	20	1980	7.8
Connellans H_B Bore	<2	3760	7.2
Amoonguna No.8	2	1430	7.3

Report No.4. 45NT/1

26th January, 1962.

ANALYSIS OF BORE WATER EX HORSE SHOE BEND NO. 1

by S. Baker

Conductivity (micro mho/cm) 26450

pH 6.95

	milliequivalent/litre	ppm
Sulphate (SO_4)	61.8	2970
Chloride (Cl)	266	9430
Carbonate (CO_3)	-	-
Bicarbonate	10	610
Nitrate (N)	-	12
Sodium (Na)	257	590
Potassium (K)	2.66	140
Strontium (Sr)	0.5	22
Calcium (Ca)	33.5	671
Magnesium (Mg)	48.4	588
Zinc (Zn)	0.09	3
Total Dissolved Solids (180°C)		20,100

Report No.5. 64NT/1

1st February, 1962.

ANALYSIS OF PHOSPHATIC ROCKS FROM THE RUM JUNGLE DISTRICT

by

S. Baker

Following are the results for the estimation of Phosphate on samples from the Rum Jungle District, submitted by C.E. Pritchard.

Field No.		per cent P_2O_5
196211	1¾ ml. N. of Sargents H.S. Massive vein Apatite	40.0
196212	1¾ ml. N. of Sargents H.S. Vein of Apatite in altered P.L. Rock	33.7
196213	1¾ ml. N. of Sargents H.S. Country Rock with vein of apatite	22.0
196214	1¾ ml. N. of Sargents H.S. Massive brecciated apatite Rock	33.2
196215	1¼ ml.S.W. of Sargents H.S. Colloform (?) Apatite	22.1
196216	1¼ ml.S.W. of Sargents H.S. Apatite, Colloform (?)	20.4
196217	1¼ ml.S.W. of Sargents H.S. Apatite (?) + Hematite	27.9
196218	1¼ ml.S.W. of Sargents H.W. Random Chip Sample	26.8
171 feet	D.D.H. No.2, Waterhouse No.2 Prospect	14. 2
204 feet		
216 feet		11.4

Report No.6 64NT/1
84NT/10A

February, 1962.

ESTIMATION OF PHOSPHATE ON SAMPLES FROM THE RUM JUNGLE AREA

by S. Baker

Following are further results for the determination of phosphate and iron ore on samples from the Rum Jungle area.

Sample No.	Locality	%P_2O_5	%Fe_2O_3
1	300' S.W. of Dyson's Open cut	2.9	-
2		1.6	-
3	100' S.W. of Dyson's Open cut	26.2	-
4		21.7	-
5		1	90.9
	Costean (long) N.of	1	91.0
6	Dyson's Open cut	1	
7		1	82.4
8	W. side of Finniss River, N.of Brown's	26.4	-
9	92' D.D.H. 555 Geolsec Area.	22.0	

Sample 9 is a dolomitic limestone with apatite replacement.

Report No.7.

84NT/10A
64G/1

ESTIMATION OF PHOSPHATE ON DRILL CORES FROM THE RUM JUNGLE AREA.

by

S.Baker

Following are results for the determination of phosphate on Drill Cores from Rum Jungle, submitted under cover of BPR/THM, 19th January, 1962.

Sample	per cent P_2O_5
D.D.550_1(24E 17.6 N. Flynn's)	
20 - 37 ft.	7.4
37 - 52 ft.	24.0
52 - 70 ft.	5.7
70 - 83 ft.	<1.0
83 - 97 ft.	<1.0
97 -114 ft.	3.4
114 -129 ft.	1.6
129 -157 ft.	1.8
C.D.315 (20.1E 10N Rum Jungle Creek)	
Six samples 192-220 ft.	less than 5.0
C.D.318 (15.8E 10N,Rum Jungle Creek)	
three samples from 45-65 ft.	less than 5.0
C.D.320 (15.9E 13.25N Rum Jungle Creek)	
nine samples 52½ ft. - 493 ft.	less than 5.0
D.D.299 (5W,11N,Rum Jungle Creek)	
three samples 112-255 ft.	less than 5.0
D.D.522 (5W,11N,Rum Jungle Creek)	
four samples 50-177 ft.	less than 5.0

Report No.8.

64NT/1
84NT/10A
26th February,1962

ESTIMATION OF PHOSPHATE ON SAMPLES FROM THE RUM JUNGLE AREA

by S. Baker

Following are further results for the determination of Phosphate on samples from the Rum Jungle Area, Eastwick's Anomaly.

Sample No.	P_2O_5 (percent)
F9E/19N 0-6 ROD 1	12.8
F/9E/19N 6-12 ROD 2	11.3
F/9E/19N 12-16 ROD 3	14.2
F/10E/18N 0-6	1.3
F/11E/18N 0-6	1
F/11E/18N 6-12	1
F/11E/18N 12-18	1
F/12E/20N 0-6	2.0
F/12E/20N 6-12	2.0
F/12E/20N 12-18	3.4
F/12E/20N 18-24	6.3
F/12E/20N 24-30	5.7
F/12E/20N 30-34	4.4
F/11E/19N 10-18	1.7

Report 9.

64NT/1
84NT/10A

5th March, 1962.

ESTIMATION OF PHOSPHATE ON CORE SAMPLES FROM THE RUM JUNGLE AREA.

Following are further results for the determination of Phosphate on core samples from the Rum Jungle area :-

D.D.H. 555	P_2O_5 %
25'-30'	20.5
30'-35'	22.0
35'-40'	18.2
40'-45'	15.8
45'-50'	14.9
50'-55'	16.8
55'-60'	2.5
60'-70'	6.6
92'-	14.2
D.D.H. 550	
20'-25'	22.0
29'6"-31'6"	12.4
31'6"-34'	13.2
34'-36'6"	15.1
36'6"-39'	17.6
39'-41'6"	12.5
41'6"-44'	7.6
44'-46'6"	7.8
46'6"-49'	23.5
49'-51'6"	16.8
51'6"-54'	8.3
54'-56'6"	2.2
56'6"-59'	2.3
59'-60'	1.2

Report No.9

64NT/1
84NT/10A

15th March,1962.

ESTIMATION OF PHOSPHATE ON CORE SAMPLES FROM THE RUM JUNGLE AREA

by

S. Baker

Following are further results for the determination of phosphate on core samples from the Rum Jungle Area.

		P_2O_5(percent)
D.D.H. 550	159' - 227'	<1
"	227' - 256'	<1
555	58½ - 80'	6.0
"	80' - 97'	9.1
	97' - 135'	5.4
	135' - 172'	2.8
	172' - 220'	1
	220' - 277'	2.3
D.D.H. 558	155' - 174'	1.0
	250' - 270'	<1
D.D.H. 559	20' - 36'	<1
	36' - 52'	<1

cont...

		P_2O_5 (percent)
DDH 559	52' - 103'	<1
	103' - 197'	<1
DDH 560	20' - 37'	<1
	37' - 54'	<1
	54' - 72'	6.4
	72' - 89'	8.6
	89' - 107'	9.2
	113' - 135'	3.8
	136' - 195'	1

Report No. 9.

64NT/1
84NT/10A

15th March, 1962.

ESTIMATION OF PHOSPHATE ON DRILL CORE SAMPLES FROM THE RUM JUNGLE AREA.

by

S. Baker

Following are further results for the determination of phosphate on core samples from the Rum Jungle Area.

		P_2O_5 (percent)
D.D. No. 553	20 - 35'	<1
	35 - 84'	<1
	84 - 103'	1.5
D.D. No. 564	20 - 33'	6.9
	33 - 45'	3.7
	45 - 47'	12.5
	57 - 69'	5.8
	69 - 82'	6.9
	82 - 99'	9.6
	99 - 115'	8.2
	115 - 132'	10.9
	132 - 144'	7.2

Report No. 10

46NT/1

20th March, 1962.

SPECTROGRAPHIC EXAMINATION OF PORPHYRY SAMPLES FROM THE TENNANT CREEK AREA, N.T.

by

A.D. Haldane

The following results were obtained on eight samples of porphyry from the Tennant Creek Area, N.T., submitted by P.W. Crohn.

Sample No.	Description and Locality	Metal Content in p.p.m. Cu	Pb	Co	Ni	V	Mo
199527	Porphyry, 3 ml.W. of New Hope Mine, 100 yd. N. of track.	10	n.d.	10	<10	20	10

cont...

Report 10 (cont.)

Sample No.	Description and Locality	Metal Content in p.p.m.					
		Cu	Pb	Co	Ni	V	Mo
199528	Ferruginous porphyry, 2ml. W. of New Hope Mine, $\frac{1}{4}$ml. S. of track.	<10	n.d.	<10	10	10	n.d.
199529	Slightly sheared porphyry 2 ml. E. of New Hope Mine, 50 yd. S. of track.	10	n.d.	<10	10	20	n.d.
199530	Strongly sheared porphyry, 2 ml. E. of New Hope Mine, 50 yd. S. of track.	<10	n.d.	<10	<10	40	n.d.
199531	Silicified porphyry, 2ml. W. of New Hope Mine, 50 yd. S. of track.	<10	n.d.	<10	<10	10	n.d.
199532	Sheared porphyry, 2ml. W. of New Hope Mine, $\frac{1}{4}$ml. S. of track.	<10	n.d.	<10	20	50	n.d.
195333	Porphyry, 2ml. E. of New Hope Mine, $\frac{1}{4}$ ml. W. of track.	<10	n.d.	<10	20	20	10
199534	Porphyry, 2 ml. E. of New Hope Mine, $\frac{1}{2}$ ml. N. of track.	30	<10	<10	<10	70	n.d.

n.d. = not detected, at a level of 1-5 p.p.m.

Other elements sought but not detected were Sn, Zn and Be.

Report No. 11.

79/PNG/1

24th March, 1962.

CHEMICAL ANALYSES OF CLAYS FROM THE KIKORI RIVER AREA, NEW GUINEA

by

S. Baker.

Three samples of clay were submitted by S. Bruce on behalf of Sir Alexander Gibb and Partners, consulting engineers. The analyses required were for

Al_2O_3, Fe_2O_3 and SiO_2

The results for the samples which are labelled sample 1, 2 and 3 are given below :

Sample No.	SiO_2 %	R_2O_3 (Fe_2O_3 + Al_2O_3 + TiO_2 + P_2O_5) %	Fe_2O_3 %
1.	50.86	25.13	7.98
2.	55.36	28.27	9.90
3.	48.42	28.20	9.80

Report No.12. 78 PNG/1

9th April, 1962.

ANALYSIS OF LIMESTONE

by

S. Baker

Following are results for the estimation of Calcium and Magnesium in five limestone samples, submitted by Dr. S. Bruce.

Sample No.	Ca (%)	Mg (%)	Origin
H.1	39.68	*n.d.	Pinnacles, Middletown Area.
H.2	39.30	0.2	
Q.1	39.68	0.1	
Q.2	39.68	0.25	
S.1	39.48	0.05	Pinnacles, Serebi, Kikori Junction

* n.d. - not detected

Report No.13. 84NT4/A

16th April, 1962.

SPECTROCHEMICAL ANALYSIS OF ROCK SAMPLES FROM THE AMADEUS TROUGH AREA N.T.

by

E.J. Howard

The samples were submitted for qualitative analysis by A. Wells. They are numbered ML6, ML37, ML71, ML72, MR23, MR26A, and MR26C. The undiluted samples were arced to completion using anode excitation and a constant direct current of 10A. The spectrum from 3,600A - 2480A was recorded on an Ilford N.50 plate.

The following table lists the results obtained:

The line intensity for certain elements were compared with available standards to give an "order of magnitude" for those elements.

RESULTS

Element	Sample Number						
	ML6	ML37	ML71	ML72	MR23	MR26A	MR26C
Zinc	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Cobalt	100ppm	10ppm	10ppm	n.d.	n.d.	n.d.	n.d.
Nickel	10	10	10	10	n.d	10	10
Copper	10	100		10	10	10	10
Tin	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	20
Vanadium	50	50	100	50	100	20	50
Lead	20	400	400	150	10	10	10
PO_4^{3-}	Present 10%	20%	n.d.	n.d.	n.d.	n.d.	n.d.

CONT...

Report 13 (cont.)

Results(cont.)

Element	Sample Number						
	ML6	ML37	ML71	ML72	MR23	MR26A	MR26C
Iron	Present	Present	Present	Present	Present	Present	Present
Silicon	" (M)	" (M)	"(M)	"	"	"(M)	"(M)
Manganese	"	"	"	"(high)	"	"	"
Calcium	"	" (M)	"(M)	"(M)	"(M)	"(M)	"
Titanium	"	"	"	"	"	"	"
Magnesium	"	"	"(M)	"(M)	"(M)	"	"(M)
Aluminium	"	"	"(M)	"	"	"	"
Potassium	"	"	n.d.	"	n.d.	"	"
Sodium	"	"	present	"	n.d.	n.d.	"

n.d. - not detected
M - major element
High- above normal

Rh, Ru, Pd, Cd, La, Be, Sb, Os, Li, Ir, Ri, Pt, Ce, W, Tl, As, Au were not detected in any sample. A trace of Ag was found in ML71.

Report No. 14.

64NT/1
94NT/1

1st May, 1962.

ANALYSIS OF IRONSTONE

by

S. Baker

Following are results for the partial analysis of two samples of ironstone submitted by W. Jauncey.

Field No.	Locality	SiO_2	Fe_2O_3	Al_2O_3	TiO_2
GAB 707GA	Brighton Downs SF 54-15, Q'ld. Holbarton	31.96%	44.22%	14.0%	1.1%
GAB 747L	Brighton Downs SF 54-15, McKartney	11.22%	84.6%	n.d.	n.d.

n.d. = not determined.

Report No. 15 46NT/1

9th May, 1962.

SPECTROGRAPHIC ANALYSIS OF BORE CUTTINGS

by

A.D. Haldane

The following results were obtained from the spectroscopic examination of sixteen samples from bores sunk in the Bitter Springs Formation, N.T.. The samples were submitted by T. Quinlan, Alice Springs, for estimation of copper, cobalt, nickel and zinc. All results are in parts per million.

Sample No.	Depth	Copper	Cobalt	Nickel	Zinc	Tin	Lead
WRB/O(F157)	74'	20ppm.	n.d.	n.d.	n.d.	n.d.	n.d.
	76-86'	10	10ppm.	<10 ppm.	n.d.	n.d.	10 ppm.
	88-94'	<10	<10	<10	n.d.	n.d.	<10
	96-102'	<10	<10	<10	n.d.	n.d.	<10
	Sludge 102'	<10	<10	<10	n.d.	30ppm.	20
	104-106'	<10	<10	<10	n.d.	n.d.	<10
	108-114'	<10	<10	<10	n.d.	10	<10
	116-122'	<10	<10	<10	n.d.	10	<10
	124-130'	<10	<10	<10	n.d.	n.d.	<10
	133-135'	<10	<10	n.d.	n.d.	n.d.	<10
	Sludge 133'-135'	<10	<10	<10	n.d.	n.d.	<10
WRB/U(F163)	202-218'	<10	<10	<10	n.d.	n.d.	50
	238'	10	10	<10	n.d.	n.d.	40
	240-250'	<10	<10	<10	n.d.	n.d.	10
	250-260'	10	<10	<10	n.d.	n.d.	20
WRB/X	150'	10	220	150	n.d.	n.d.	40

n.d. = not detected. Detection limit for Zn is 50 ppm.

Report No. 16. 120NT/15

14th May, 1962.

ANALYSIS OF PHOSPHATIC ROCK SAMPLE FROM MOUNT LIEBIG AREA, N.T.

by

N.W. Le Roux

Following is the result of a phosphate analysis on a sample of phosphatic limestone submitted by A. Wells.

Field No.	Locality	P_2O_5
M.L.37	Mt. Liebig area. Run 12. Photo 5090. Stairway Sandstone Formation.	17.96%

Report No. 17.

84NT4/A
64NT4/A

21st May 1962

BERYLLIUM IN RUM JUNGLE PHOSPHATE

by

A.D. Haldane

12 samples from Flynn's Area as follows :-

2 samples from Eastick's Anomaly
6 samples from Geolsec Anomaly
1 sample from Area 3
3 samples from Area 4

With the exception of one sample from Area 4 all samples are from outcrop.

Eastick's Anomaly	10 ppm Be	(average)
Geolsec Anomaly	13 ppm Be	(average)
Area 3	8 ppm Be	(single result)
Area 4	10 ppm Be	(average)

Overall average 10 ppm Be range 3-20 ppm Be.

Report No.18

170F/1

7th June, 1962.

ANALYSIS OF BRINE AND WATER SAMPLES FROM ANTARCTICA

by

S. Baker

Following are results for the analysis of Brine and Water samples from Vestfold Hills.

The results show, that there is no differentiation between Top, Middle and Bottom of the lakes.

		Cl	SO_4	HCO_3	Mg	Ca	Na	K	Sr	T.D.S.
Lake Dingle:										
	T	136	3.07	0.3	9.59	2.61	66.9	2.36	0.03	219.3
	M	136	3.06	0.3	9.59	2.61	66.9	2.36	0.03	
	B	136	3.07	0.3	9.59	2.62	66.9	2.36	0.03	
Lake Stinear:										
	T	152	3.00	0.2	9.50	2.52	78.7	2.49	0.02	247.9
	M	152	3.00	0.2	9.50	2.52	78.7	2.48	0.02	
	B	152	3.01	0.2	9.50	2.52	78.7	2.49	0.02	
Deep Lake:										
	T	169	2.96	0.3	13.60	2.40	78.9	3.90	0.01	272.1
	M	169	2.95	0.3	13.61	2.40	78.9	3.90	0.01	
	B	169	2.97	0.3	13.60	2.40	78.9	3.90	0.01	
Club Lake:										
	T	170	2.91	0.2	13.40	2.42	81.0	3.73	0.008	273.0

The above results are expressed in grams per litre.

Report No. 19

45ACT/1

12th June, 1962.

Analysis of a water sample taken from Sutton 1 Bore at A.B.M. Federal Highway Quarry on 18th May 1962.

by

S. Baker

	mg/l	me/l
Silica (SiO_2)	35	
Iron, Alumina ($Fe_2O_3 + Al_2O_3$)	12	
Chloride (Cl)	165	-4.65
Sulphate (SO_4)	343	-7.14
Calcium (Ca)	50	+2.49
Magnesium (Mg)	119	+9.78
Sodium (Na)	98	+4.26
Bicarbonate (HCO_3)	300	-4.90
Potassium (K)	<0.01	
Strontium (Sr)	<0.01	
T.D.S.	945	
Conductivity (25°C)	1430	
pH	6.6	

Report No. 20

64/NT/1

25th June, 1962.

PHOSPHATE ANALYSIS ON TWO ROCK SAMPLES

by

N.W. le Roux

These are the results of a phosphate analysis on two rocks submitted by R. Bryan.

Field No.	Lab. No.	Type	Locality	P_2O_5
R.8915	62/1086	Granite	Mt. Todd, N.T.	11.96%
R.11955	62/1087	Amphibolite	Batchelor, N.T.	1.75%

PART II.

PETROGRAPHIC, MINERAGRAPHIC AND X-RAY INVESTIGATIONS

120 NT/1
15th January, 1962.

Report No. 1.

"GREISEN" FROM TIPPERARY ONE- MILE SHEET AREA, N.T.

by

W.B. Dallwitz.

Introduction

B.P. Ruxton, of the Darwin Office, has submitted a specimen of greisen for petrographic description and testing for P_2O_5, Ta_2O_5, and Cb_2O_5. The specimen was collected from a locality about 6 miles west of Fenton airstrip, Tipperary 1-mile Sheet area, Pine Creek 4-mile Sheet area (D52/8), N.T..

Petrography

The hand specimen (Reg.No.R10787) is medium-grained and porous, and consists of fairly hard clots of a reddish, (iron-stained) clay mineral, muscovite and greyish white quartz.

In thin section (No.8377) the clay mineral is buff-coloured and mostly isotropic, and its refractive index is less than that of balsam. It is impregnated with hydrated iron oxide and fine-grained silica, and this accounts for the apparent hardness of the clots. It is not possible to identify the clay mineral from thin section examination alone, though it is likely to be either halloytite or allophane.

The quartz is strongly strained and slightly recrystallized in places.

Many of the books of muscovite are interleaved by layers of clay mineral, and some of the clots of clay mineral contain veinlets and pockets of fine-grained muscovite.

Because of its large content of clay mineral this rock can not strictly be called a greisen; however, its mode of formation appears to have been similar to that of greisen. Feldspar has been replaced by clay, muscovite, and fine-grained silica, and hydrated iron oxide may have been derived from mafic minerals.

Chemical and X-Ray Spectrographic Tests.

A test for phosphate, carried out by S. Baker, gave a negative result, and an X-ray spectrographic test by S.C. Goadby showed that columbium and tantalum are also absent.

Report No. 2

139/G/1
23rd January, 1962.

IDENTIFICATION OF THE HEAVY MINERAL IN A SAND SAMPLE FROM WINNECKE CREEK, NORTHERN TERRITORY.

by G.J.G. Greaves.

A black heavy mineral concentrate, panned from a sand sample, was submitted by J. Barclay, Resident Geologist, Tennant Creek for J. Ross of Tennant Creek. The sample was collected from Winnecke Creek, Northern Territory and the identity of the heavy minerals was required.

The mineral was identified by X-ray diffraction as ilmenite.

24th January, 1962.

MINERALOGY OF A TIN CONCENTRATE FROM MT. SURPRISE AREA, QUEENSLAND.

by

G.J.G. Greaves

Introduction

A heavy mineral concentrate, inwhich no mineral would give the field test for tin, was submitted by D.O. Zimmerman for F. Chapman, Managing Director of Ravenshoe Tin Company. The concentrate is from the Mt. Surprise area, Queensland and the identity of the minerals, and abundance of cassiterite was required.

A thin section (7835) and a polished section of the concentrate (field number PEC. M5. A.G.L.) were prepared for the examination. The sample proved to be unsuitable for mineral separation by the superpanner, but a separation was made on the Frantz isodynamic separator. If required more exact abundance of each mineral could be calculated by point counting the grains, allowing for differences in size and specific gravity of the minerals.

MINERALOGY

Specific Gravity	Magnetic Properties	Mineralogy	Percentage by weight
(a) > 2.8	Most magnetic	Ilmenite with a little pink garnet.	52.4%
(b) > 2.8	Less magnetic than (a)	Pink garnet with a little ilmenite.	20.4%
(c) > 2.8	Less magnetic than (b)	Lemon yellow monazite with a little cassiterite and orthopyroxene	4.6%
(d) > 2.8	Less magnetic than (c)	Cassiterite with a little monazite.	22.4%
(e) < 2.8	-	Quartz	0.2%

The ilmenite forms equidimensional grains with an average diameter of 0.5 mm. The anisotropism is somewhat anomalous, varying from blue to tan. However, other properties of this mineral, including reflectivity, streak and lack of internal reflection are identical with these of ilmenite. The identity of the mineral was confirmed by X-ray diffraction.

The cassiterite which has strong internal reflections ranging from orange to red, is strongly twinned; in thin section it is intensely pleochroic through red, brown, yellow to colourless. The mineral forms equidimensional grains which measure roughly 0.8 mm. in diameter.

The remaining minerals are pink garnet, lemon yellow monazite, pleochroic orthopyroxene, and quartz; the garnet commonly forms equidimensional grains with an average diameter of 0.5 mm.; monazite and orthopyroxene form prisms up to 0.4 mm. long.

Zinc Test for Tin.

The pure cassiterite obtained from the concentrate rapidly forms a coating of metallic tin, using the zinc dish method with 1N hydrochloric acid. However, if the acid is too dilute, or the zinc dish is slow to react with the acid, then the test will be negative. When the sample was received, it was tested for tin by the zinc dish method; it gave a negative result probably due to one or both of the previously mentioned reasons for the failure of this test.

Conclusions.

The heavy mineral concentrate consists of cassiterite ilmenite, and garnet, together with minor amounts of monazite, orthopyroxene and quartz. Cassiterite forms over 20% by weight of the sample and it will usually give the zinc test for tin.

Report No. 4.

46NT/1
1st February, 1962.

MINERALOGICAL EXAMINATION OF SAMPLES FROM TIN LODES FROM THE MT. WELLS - MT. HARRIS AREA, NORTHERN TERRITORY.

by

G.J.G. Greaves.

Introduction

Thirteen samples from tin lodes in the Mt. Wells - Mt. Harris area were submitted for mineralogical examination by P.W. Crohn, Senior Resident Geologist at Darwin. The identity and abundance of the heavy minerals, together with thin and polished section examination of each sample was required.

Representative portions of the crushed samples were re-crushed so that all the material passed through a 40 mesh sieve and the following fractions were collected.

(a) -40 mesh, + 60 mesh.
(b) -60 mesh, + 100 mesh.
(c) -100 mesh.

The heavy minerals were concentrated on a Haultain superpanner and were then tested for tin by placing in a zinc dish and adding 1 N hydrochloric acid; a coating of metallic zinc will be formed on any cassiterite grains present. In the finer sieve fractions some cassiterite was lost because of sliming during the separation.

MINERALOGY

Sample No. 199603 was collected from Jessop's Lode in a costean 300 feet south of the open cut.

Colloform hydrated iron oxide and minor hematite were the only minerals concentrated by the superpanner.

The rock consists of about 35% hydrated iron oxides and minor hematite, 20% laminated shale and siltstone fragments, and 45% quartz.

Colloform hydrated iron oxide and hematite enclose and replace both the quartz grains and rock fragments. Quartz forms small grains with an average measured diameter of 0.1 mm., and larger grains up to 6mm. x 3.5 mm. These larger grains show a mosaic texture typical of complete recrystallisation. The rock fragments are cut by veinlets of recrystallised quartz up to 0.1 mm. wide.

Sample No. 199604 was collected from Jessop's Lode at the north end of the open cut, in November 1961.

Cassiterite was recovered and identified only from the -100 mesh sieve fraction. The mineral was fine grained and in all coarser fractions was obscured by iron oxide. The separation was repeated with the whole sample ground to less than 100 mesh, and it was found that hydrated iron oxide inhibited the zinc test for tin on the major portion of the sample. The iron oxide was removed by boiling in concentrated hydrochloric acid, leaving 33% cassiterite and about 1% hematite. All of this clean cassiterite gave a positive zinc test for tin.

Sample No. 199605 was collected from Jessop's Lode in the small workings 20 feet north of the open cut.

The heavy minerals recovered formed 0.37% of the sample. Most of this heavy fraction gave a positive test for tin. The only impurity was a minor amount of hematite.

The rock consists of about 50% hydrated iron oxides and minor hematite, 45% quartz and 5% of an unidentified clay-like mineral. Quartz, which is enclosed by hydrated iron oxides and hematite, forms grains up to 5mm. x 2 mm. These grains show shadow extinction and are full of fine grained indeterminate conclusions. Quartz also is present as finer grains with an average diameter of 0.1 mm. Hematite forms circular grains with an average diameter of 0.037 mm. in the hydrated iron oxides. A secondary greenish orange clay-like mineral is present in the hydrated iron oxides, but it could not be identified.

Sample No. 199606 is a chip sample collected from Jessop's Lode at the tramway west of the open cut.

The heavy minerals recovered formed 0.1% of the sample. All of the heavy fraction gave a positive test for tin.

Sample No. 199607 was collected from the dump of the watershaft Mt. Masson Mine.

Pyrite and tourmaline were the only heavy minerals recovered.

The rock consists of about 85% quartz, 10% pyrite and 5% tourmaline. The quartz shows shadow extinction and in places is recrystallised. It is full of inclusions which are too small to identify. Pyrite forms irregular grains up to 8 mm. x 3 mm. and the tourmaline is concentrated in clusters along veins up to 0.5 mm. wide in the quartz.

Sample No. 199608 was collected from the dump of the main adit, Mt. Masson Mine.

The hand specimen appears to be composed mainly of white vein quartz with about 5% dark and brassy-yellow sulphides. These are in a single irregular area about 10 mm. x 5 mm.

The polished section shows that the sulphides are 70% sphalerite, 20% pyrrhotite, 5% galena, 2% marcasite, 2% calcopyrite and 1% stannite. Sphalerite forms a single irregular grain about 10 mm. x 5 mm. which encloses or partially encloses the other sulphides. Pyrrhotite forms grains up to 2.2 mm. x 0.7 mm. with a mosaic texture and partly altered to marcasite, partly replaced by sphalerite. Galena, chalcopyrite and stannite form irregular inclusions in the sphalerite. Stannite also forms exsolution lamellae in the sphalerite.

Sample No. 199609 is from the roof of the adit, just beyond cross-cut, west portion, Mt. Masson Mine.

The heavy minerals recovered formed 1.2% of the sample. 75% of this heavy fraction gave a positive test for tin; the remainder consisted of hydrated iron oxied and minor amounts of tourmaline and pyrite.

In thin ssction the rock consists of about 80% quartz, 15% tourmaline and 5% hydrated iron oxide, hematite and pyrite. This sample is very similar in texture to sample No. 199607.

Sample No. 199610 is from the roof of adit just beyond cross-cut, east portion, Mt. Masson Mine.

The heavy minerals recovered formed 0.02% of the sample. About 50% of this heavy fraction gave a positive test for tin; the remainder consisted of hematite and blue tourmaline.

In thin section the rock consists of about 70% vein quartz, 30% fine grained tourmaline, and minor hematite. This rock is very similar in texture to sample No. 199607.

Sample No. 199611 is a grab sample collected from the dump of the Tin Can Mine.

The heavy minerals recovered formed 3.2% of the sample. Most of this heavy fraction gave a positive test for tin. A minor amount of hematite and hydrated iron oxide formed the remainder of the heavy mineral fraction.

Report No. 4 (cont.)

Sample No. 199611 (cont.)

In thin section the rock consists of about 45% vein quartz, 15% tourmaline, 40% hydrated iron oxide and hematite, both of which enclose the quartz and tourmaline, some minor cassiterite and zircon. A subhedral cassiterite grain measuring 0.16 mm. x 0.8 mm. is slightly replaced by the enclosing hydrated iron oxide. A single euhedral zoned crystal of zircon measuring 0.18 mm. x 0.1 mm. is enclosed by quartz.

Sample No. 199612 is a grab sample collected from the dump of the Valley Mine.

The heavy minerals recovered form 4.4% of the sample. All the heavy fraction gave a positive test for tin.

Twenty per cent of the polished section consists of cassiterite which forms equidmensional zoned subhedral crystals up to 5 mm. in diameter. It has been fractured and recemented by hydrated iron oxide and quartz. There is only slight replacement of the cassiterite by these minerals, in that most of the fractures have matching or nearly matching walls. In most cases the mineral is enclosed in quartz although a small quantity is enclosed in hydrated iron oxide.

In thin section the rock consists of 50% quartz, 45% hydrated iron oxide, and 5% tourmaline, muscovite, and very minor cassiterite. Quartz forms recrystallised grains up to 10 mm. x 6 mm., that have been fractured and recemented with hydrated iron oxide, and very fine grains with an average diameter of 0.05 mm. Tourmaline also forms fine grains with an average diameter of 0.05 mm., both the quartz and tourmaline are enclosed by colloform hydrated iron oxide. The minor amount of cassiterite present in the slide is enclosed by and partly replaced by the hydrated iron oxide.

Sample No. 199613 is from the face of No. 3 adit, Mt. Wells Mine. The heavy minerals form 2.4% of the sample. About 20% of this heavy fraction gave a positive test for tin. The remainder consisted of hydrated iron oxide, hematite and a minor amount of cassiterite which did not give a positive zinc test.

In thin section the rock consists of 70% vein quartz most of which has been recrystallised, and 30% fine grained tourmaline.

Sample No. 199614 is from the roof of No. 3 adit about 150 ft. from the face, Mt. Wells Mine.

Pyrite and minor tourmaline were the only heavy minerals recovered.

In thin section the rock consists of about 70% sericite, 20% quartz and 10% tourmaline. The quartz and sericite are very fine grained and exhibit relict sedimentary bedding. The tourmaline forms grains which are concentrated in conformable lenses with coarser-grained quartz.

Report No. 4 (cont.)

Sample No. 199615 is from the footwall of the first cross-cut in No. 3 adit Mt. Wells Mine.

One per cent hematite (confirmed by X-ray diffraction) was recovered from the two finer sieve fractions.

In thin section the rock consists almost entirely of vein quartz which shows shadow extinction and recrystallization along veins. Very fine veins of hematite cut the rock and one plate of muscovite 0.08 mm. across was observed.

SUMMARY OF THE WEIGHT PER CENT OF CASSITERITE RECOVERED BY THE HAULTAIN SUPERPANNER AND THE ANALYSIS FOR TIN OF EACH SAMPLE BY A.M.D.L. (AN 2110/155)

Field No.	Weight % cassiterite recovered	Analysis (%Sn)
199603	Nil	0.024%
199604	33%	28.8%
199605	0.37%	1.24%
199606	0.1%	0.225%
199607	Nil	0.092%
199609	0.9%	1.40%
199610	0.01	0.072%
199611	3.2%	4.62%
199612	4.4%	6.02%
199613	0.5%	1.04%
199614	Nil	0.080%
199615	Nil	0.058%

Report No. 5.

46NT/1
1st February, 1962.

HEAVY MINERALS IN SAMPLES FROM THE BIG DRUM TIN MINE, MT. HARRIS, NORTHERN TERRITORY

by

G.J.G. Greaves

INTRODICTION

Two chip samples from the Big Drum Tin Mine, Mt. Harris, Northern Territory, were submitted by P.W. Crohn, Senior Resident Geologist, Darwin, for identification of heavy minerals and determination of their abundance.

Representative portions of the samples were crushed to pass through a 60-mesh sieve, and the following fractions were collected:

(a) - 60 + 100 mesh

(b) -100 mesh.

The heavy minerals in both fractions were concentrated on a Haultain superpanner, and both thin and polished sections of the final concentrates were prepared for examination.

Report No. 5 (cont.)

IDENTITY AND ABUNDANCE OF THE HEAVY MINERALS

Sample No. 199525: Dish concentrate from a composite sample of the lode, in the adit and on the surface.

The approximate weight percentage heavy mineral content of the sample was determined as cassiterite, 0.05; colloform hydrated iron oxides, 35; and pyrite, 1.

Sample No. 199526: Part of a channel sample collected from the face of the adit 94 feet from the portal and 18 inches above the floor.

The approximate weight percentage heavy mineral content of the sample was found to be: cassiterite, 3.5; colloform hydrated iron oxides, 15; and pyrite, 1. The cassiterite is buff-coloured, and its identity was confirmed by X-Ray diffraction. A few composite grains of cassiterite and hydrated iron oxide were present in the cassiterite concentrate. Minor amounts of tourmaline and traces of cassiterite were noted as separate grains in the concentrate of hydrated iron oxide.

Report No. 6

66/PNG/1
2nd February, 1962.

IDENTIFICATION OF HEAVY MINERALS FROM A BLACK BEACH SAND FROM BOOTLESS INLET, PAPUA.

by

G.J.G. Greaves.

A black sand collected from Bootless Inlet by R. Cavanagh was submitted by G.A. Taylor, senior geologist, Papua. The identification of the black minerals was required.

A hand magnet was used to separate the most magnetic fraction, which was found to form about 30% of the sample. This was identified as magnetite. The remaining portion of the sample was run through the Isodynamic separator and the most magnetic fraction from this separation, about 24% of the sample, was identified in polished section as ilmenite. The remaining fraction consisted of the common rock forming minerals, augite, orthopyroxene, zoned plagioclase, brown hornblende and minor quartz.

CONCLUSION :

The black minerals in the sand were identified as magnetite and ilmenite - probably derived from a basic igneous rock.

Report No. 7.

106G/15/26
19th February, 1962.

Petrographic Notes on Carbonate Rocks, from Spirit Hill No. 1 Well

15°30' Lat.
129° 04 Long.

by

L.V. Bastian

Ten samples of carbonate rocks from Spirit Hill No. 1 Well in the Bonaparte Gulf Basin, Northern Territory, were submitted by P.J. Jones, for petrographic examination. These were cores taken from the depths 968 ft., 991 ft., 1007 ft. (two), 1025 ft., 1036 ft., 1052 ft., 1067 ft., 1082 ft., and 1100-1100½ ft.. The problem was to determine whether they can be classed as dolomites, as recorded in the composite well log by R. Hare & Associates, or as limestones.

Dr. J.E. Glover previously classified cores from 921-921½ ft., and 968-968½ ft., as dolomites, and a core from 1111-1111½ ft. as a dolomitic siltstone, all of which are very poorly fossiliferous. There is no petrographic information, however, about the richly fossiliferous section covering the 968-1100 ft. interval.

The samples were first immersed in a solution of 2N formic acid for a period of two minutes each, resulting in a shallow etch showing good relief under the stereoscopic microscope. Earlier notes (Glover, B.M.R. Report 18) had suggested a 15-minute etch, but in these samples this etch proved too deep, large numbers of small dolomite rhombs being dislodged. Four thin sections were then cut from cores at depths 991', 1025', 1067', and 1100' - 1100'6", to allow examination of the textural relationships.

The rocks were found to be sandy or silty fossiliferous limestones and dolomites, showing a very patchy replacement of calcite by dolomite. In several samples, the replacement ranges from almost zero to nearly 100% over merely an inch or so. A general trend in replacement was noted. After 968', a dolomitic limestone, the next three cores beneath (1007', 1025', and 1035') are almost free of dolomite, which is found only in isolated groups of small rhombs. Thereafter, dolomite replacement is general, and the rocks range from dolomitic limestones to dolomites, with one exception (1052', which is almost free of replacement). However, in view of the obviously very patchy distribution, it is possible that this trend is entirely fortuitous.

Summary Table of Main Constituents

Depth	Detritals	Calcite	Dolomite
968'	<1%	10% - 80%	90% - 20%
991'*	10%	90%	<1%
1007'	2%	98%	<1%
1025'*	30% - 50 %	70% - 50%	1%
1036'	30%	10% - 60%	60% - 10%
1052'	30%	70%	<1%
1067'*	20%	15% - 60%	65% - 20%
1082'	nil	15%	85%
1100'*	1% - 5%	80% - 25%	15% - 70%

* Thin Section.

Report No. 7. (Cont.)

Brief petrographic notes on the thin section

The rocks are sandy or slightly silty carbonate rocks. In general, grain-size is related to the amount of detritals, the coarser sands occupying important parts of the framework, and the silts occurring only in minor amounts. Sandy types carry well-rounded quartz, up to 0.5 mm. in size, many grains showing prominent authigenic growths. Both detrital grains and fossil fragments form nucleii for oolitic structures; this is particularly well seen in core 1025', which also has many independent oolites. The rocks originally appear to have been porous, as the calcite takes a granular form typical of a cavity filling. Dolomite replacement has generally begun with small groups of rhombs, and shows a preference for some types of carbonate - e.g. oolite centres. More extensive dolomitization is accompanied by loww of the euhedral outlines and development of a granular interlocking texture.

Conclusion.

The study showed a slight preponderance of calcite over dolomite in the 968-1100 ft. interval, but probably these rocks are sufficiently dolomitized to be considered as part of the neighbouring dolomite lithology identified above and below this section.

Report No. 8. 18B/15

22nd February, 1962.

ANALYSIS OF MINERALS FROM MARANBOY N.T.

by

S.C. Goadby.

P. CROHN

Two samples, one crushed, the other broken with a hammer, suspected of being either tin or tantalite, were submitted by P.W. Crohn.

They were both collected from a location six miles north of Maranboy N.T..

Both samples have beenidentified by X-ray diffraction as cassiterite.

Report No. 9. 84W/1

22nd February, 1962.

X-RAY SPECTROMETRIC ANALYSIS OF A LIMESTONE FROM CARNARVON, WESTERN AUSTRALIA

by

W.M.B. Roberts.

A sample of limestone from radioactive anomaly No.1 Carnarvon Basin, W.A. which had previously been shown to contain carnotite was submitted by the Chief Geophysicist for determination of uranium content.

X-ray spectrometric analysis shows that the sample contains

0.168% U_3O_8

Report No.10. 68Q/1

1st March, 1962.

MINERALOGICAL IDENTIFICATION OF TWO SAND SAMPLES FROM CAPE BEDFORD, NORTH QUEENSLAND.

by

G.J.G. Greaves

INTRODUCTION

Two sand samples collected by K.G. Lucas from about two miles west of Cape Bedford, near Cooktown, were submitted for mineralogical examination. One sample (CK.1635) was described as a white dune sand with dark streaks of mineral grains; the composition of these dark grains was required. The other sample (CK.591) was described as a layer of dark concentrate in a beach sand, the complete mineral composition of which was required.

MINERALOGY

The heavy minerals from sample CK.1635 were separated using bromoform, and were found to form 1.37% by weight of the sample. Magnetite was separated from both samples by a hand magnet. Thin and polished sections were prepared from both samples and the volume percent of each mineral was estimated by a grain count, allowance being made for slight differences in grainsize. The weight percentage to the nearest 0.5% was calculated from the volume percent and the specific gravity of each mineral. The calculated overall specific gravity of sample CK.1635 is 4.50 and CK.591 is 4.58.

Mineral	S.G.	Volume % in Heavy Minerals from CK.1635	Weight %	Volume % in CK.591	Weight %
Zircon	4.7	15%	15.5%	25%	25.5%
Rutile	4.2	5%	4.5%	2%	2%
Ilmenite	4.7	70%	70%	70%	70%
Magnetite	5.18		3%		1%
Quartz	2.65	3%	2%	1%	0.5%
Tourmaline	3.1	7%	5%	1%	1%
Sphene	-	-	-	very minor	very minor
Corundum	-	-	-	very minor	very minor

The zircon and rutile form short rounded prisms with an average length of 0.16 mm. but all other mineral grains are well rounded and the average measured diameter is 0.12 mm.

Report No.11. 94NT/1

1st March, 1962.

PETROGRAPHIC EXAMINATION OF THREE SPECIMENS FROM THE FRANCES CREEK IRON DEPOSIT, NORTHERN TERRITORY.

by G.J.G. Greaves.

INTRODUCTION

Three specimens collected from the Frances Creek iron deposit, Northern Territory, were submitted by J.F. Ivanac for S.B. Dickinson, Technical Director of Duval Holdings, for petrological examination.

cont...

MINERALOGY

Specimen No. 1 - In hand specimen this rock is a red schist, and was submitted as an example of the country rock.

A thin section (8220) was cut perpendicular to the plane of schistosity. The rock consists of roughly 50% hematite, 45% sericite, less than 5% quartz and very minor epidote.

Much of the hematite is arranged parallel to the schistose lineation in the form of elongate crystals which measure an average 0.16 x 0.03 mm.. Veins of hematite, varying in width from 0.03 mm. to 0.08 mm. across are formed in two directions, one parallel to the schistosity and the other parallel to the axes of secondary crenulations, which are about 60° - 70° to the schistosity plane. Some of the hematite is altered to hydrated iron oxide.

The sericite is arranged parallel to the schistose lineation, forming lath shaped crystals which measure an average 0.016 x 0.06 mm. Because of the fine grainsize it is difficult to identify this mineral by normal microscopic methods (see description of specimen No. 2).

The remaining minerals are quartz and epidote which form equidimensional grains with a maximum diameter of 0.01 mm. Quartz also forms recrystallised concordant pods ranging up to 0.3 x 0.05 mm.

The rock is a quartz-sericite-hematite schist.

Specimen No.2 - In hand specimen this rock is soft, friable, dark, and fine grained, with no obvious lineation; it appears to be highly graphitic. The colour is not changed by heating a crushed sample with concentrated nitric acid. This suggests that the dark colour is not due to sulphide grains. On ignition, a crushed sample changes colour from dark grey to pale pink, suggesting that the dark colour may be due to graphite or similar carbonaceous material. A hand magnet was passed over another crushed sample but no magnetic minerals were present.

In thin section (8221) the rock consists of roughly 65% sericite, 15% hydrated iron oxide, less than 10% graphite, 5% quartz, less than 5% sodic plagioclase and minor epidote and (?) apatite.

The rock is fine grained with a fine schistosity imported by a parellel arrangement of sericite which forms laths up to 0.01 mm. long. Because of the fine grainsize it is difficult to distinguish sericite from similar minerals such as pyrophyllite or talc by normal microscopic methods. The mineral was identified by X-ray diffraction as sericite. The hydrated iron oxide forms red equigranular grains ranging up to 0.16 mm. diameter, having a random distribution. The (?) graphite is very fine grained and is disseminated along the schistosity planes. Some (?) apatite is present; it forms acicular crystals ranging up to 0.03 mm.

cont..

Report No. 11 (cont.)

Specimen No. 2 - (cont.)

long, which show parallel extinction. The remaining minerals, quartz, up to 0.05 mm. in diameter, sodic plagioclase up to 0.02 mm. in diameter, and epidote, averaging 0.002 mm. in diameter, form equidimensional grains distributed randomly throughout the rock.

The rock is a (?) graphitic sericite schist.

Specimen No. 3 - Macroscopically this specimen is finely crystalline and greyish-red in colour. No polished section could be prepared from the rock which when tested on a streak plate gave a bright red streak. A portion broken from the surface was identified by X-ray diffraction as hematite.

Report No. 12.

58/ACT/1

22nd March, 1962.

ANALYSIS OF SAMPLES FROM NEW SUBURB OF WATSON A.C.T.

by

S.C. Goadby.

Four samples were submitted by E.G. Wilson for manganese assay.

These were : -

1. Surface Gossan.
2. Brown, light-weight earth.
3. Black, light-weight earth.
4. Brecciated shale country rock.

X-ray spectrographic analysis shows samples 1. and 4. to have very low manganese content.

The manganese content of samples 2. and 3. is 29.2% and 36.9% respectively.

Report No. 13.

102 PNG/1

27th March, 1962.

IDENTIFICATION OF CARBONATE IN THREE ROCK SPECIMENS.

by

S.C. Goadby.

Three rock specimens from the following locations were submitted by H. Davies:

A23:	Oredi Creek, S.E. Fergusson Island.
A117:	Elologea Creek, N.E. Fergusson Island.
A270:	Faluva Creek, Eastern Goodenough Island.

The carbonate in all three specimens has been identified by X-ray powder-diffraction as magnesite.

Report No. 14.

106G/13/Glentulloch.

27th March, 1962.

EXAMINATION OF CLAY MINERAL CONTENT OF CORE FROM GLENTULLOCH No. 1 WELL, QUEENSLAND.

25°47'17"
148° 22'47"

by

W.M.B. Roberts.

Two core sections from the Associated Australian Oilfields Glentulloch No. 1 Well, were submitted by the Exploration Manager, Mines Administration Pty.Ltd., for identification of the clay minerals.

The sections were labelled A.A.O. GT.No.1, Core 11, 2526', and A.A.O. GT. No.1 Core 17, 2808'. Portions of both cores were crushed and sieved, and the bulk of the - 300 mesh fraction of each sample was placed in a settling column.

A small portion of each crushing was identified on the X-ray diffractometer as mainly silica with some clay - the section from 2808 feet containing more clay than section from 2526 feet, in which clay formed a very small proportion of the total.

After standing, the water column with its suspended material was decanted, centrifuged, and the clay pipetted on to glass slides and allowed to dry. One of these slides from each sample was used untreated, and one from each sample was sprayed with ethylene glycol monethyl ether.

The clay minerals in both samples were identified as mainly kaolinite or dickite, or a mixture of both, with very subordinate amounts of what is possibly montmorillonite and halloysite.

The diffractometer patterns of the glycollated slides showed no alteration of the d - spacings of the major clay constituents.

Report No. 15.

139G/1

27th March, 1962.

IDENTIFICATION OF A GREEN MINERAL IN A SPECIMEN FROM ROBINSON RIVER, NORTHERN TERRITORY.

by

G.J.G. Greaves

An altered volcanic rock (R9982) containing a dark green vein was submitted by M. Rhodes. The rock is from the Gold Creek Volcanic Member of the Nathen Formation, Robinson River, Northern Territory. Identification of this dark green mineral was required.

The mineral was identified by X-ray diffraction as glauconite.

Report No. 16. 155PNG/1

1st April, 1962.

PETROGRAPHIC EXAMINATION OF ROCK SPECIMENS FROM KHUIKIA, NEW GUINEA.

by

K.R. Walker and J.M. Rhodes.

Two rocks from Khuikia, New Guinea were submitted by Dr. N.H. Fisher, upon request by Dr. I.P. Bruce, for naming, information on mineral content and their suitability for use as aggregate.

K.1. Regiatered No. 11347
Slide No.8832
Locality Khuikia, New Guinea.
Name - Hornblende Andesite.
Texture - Porphyritic and pilotaxitic

Mineral content:

1. Brown oxy hornblende phenocrysts fringed with opaque iron mineral.
2. Plagioclase as microlithic fragments and laths (most of which are euhedral), fresh, twinned (including complex and penetration twins), and zoned. Compositional range is labradorite to andesine.
3. Moderate positive 2V, greenish tint, euhedral to anhedral grains, some grains zoned.
4. Opaque iron ore, forms broad rims to oxy hornblende grains and large and small grains which are evenly distributed throughout.
5. Groundmass, very fine grained to aphanitic, turbid, and dusted with iron ore.

The rock has no component that would be detrimental to its use as aggregate.

Registered No. 11348
Slide No.8832
Locality Khuikia
Name - Hornblende andesite
Texture - Porphyritic and pilotaxitic

Mineral content:

1. Brown oxy hornblende phenocrysts, up to 1.5 mm. in length, and surrounded by rims of hydrated iron oxide.
2. Plagioclase, as euhedral phenocrysts up to 2.5 mm. in length, and small euhedral laths within the groundmass. The phenocrysts are zoned, and although extensively altered, the andesine plagioclase of the groundmass is quite fresh.
3. Pyroxene, as very small anhedral grains, associated with oxy-hornblende.
4. Hydrated iron oxide is scattered throughout the groundmass as small amorphous masses.

cont...

Report No. 16 (cont.)

Mineral content (cont.)

The rock is moderately basic, and is not very suitable for cement aggregate. The feldspar phenocrysts are extensively altered, and of the two specimens submitted K1 No. 11347 would be the better choice.

Report No. 17.

66/PNG/1

9th April, 1962.

THE MINERAL COMPOSITION AND IRON TITANIUM ANALYSES OF TWO SAND SAMPLES FROM NEW GUINEA.

by

G.J.G. Greaves.

INTRODUCTION:

Two sand samples were submitted by Dr. D. Bruce. A grain count and iron titanium analyses were required. The sands are from the southern spit of the Kikori Serebi junctions.

Sample No. 1976 was collected from the south end of the sand spit. It is a composite sample taken from the surface to two feet depth.

Sample No. 1013 was collected from the north end of the sand spit.

MINERALOGY:

Thin sections were made of representative portions of each sand sample. The composition of each sand was estimated by means of an integrating stage. The average grainsize of the sample number 1976 is 0.16 m.m., and of the sample 1013 is 0.4 m.m..

Mineral or Rock Fragment.	Estimated Volume Per cent Sample 1976	Sample 1013
Basalt rock fragments	34%	78%
Plagioclase (Andesine - labradorite)	33%	7%
Pyroxenes (mainly clino, some ortho)	14%	6%
Calcite	9%	5%
Opaques	7%	2%
Hydrated iron oxide	3%	2%
Chlorite	minor	minor

Both sands are derived from microporphyritic basaltic rocks, but in the finer grained sample (1976) more free mineral grains have been liberated from the rock fragments.

Iron Analyses:

Sample 1976 - 7.56% Fe_2O_3. Sample 1013 - 8.85%, Fe_2O_3

Ti - <5 ppm.

Report No. 18. 106Q4/1

1st May, 1962.

LOWER BOWEN VOLCANICS

by

K.R. Walker

Twelve specimens of the Lower Bowen Volcanics in the Bowen South 4-mile Sheet area, North Queensland were submitted by E. Malone for petrological examination. They are representatives of the Mt. Devlin and Toussaint Volcanics. It was hoped that comparison between the two volcanic suites might show them to be similar, and hence resolve some doubts in the present structural interpretation of the area.

Characteristic of the Toussaint Volcanics

The three specimens (Field Nos. B243 A & B, and B244) from the type area, are petrographically similar in that they are essentially andesitic, but they differ in the amount of ferromagnesian mineral present. However, comparison between such volcanic rocks must necessarily be based on amounts and types of phenocrysts present, and on textural considerations, because the composition of the groundmass is masked by its fineness and turbid alteration.

Most of the phenocrysts are euhedral plagioclase, the largest of these measures 1½ x ½ mm., they are zoned and their average composition is probably labradorite, and in places they form glomeroporphyritic patches. Some zones are chloritized and most crystals are partly turbid. Irregular cracking is common in the plagioclase phenocrysts and many cracks are filled with hydrous iron oxide.

For andesitic rocks the modal abundance of ferromagnesian minerals is low. Moreover, between rocks there is a range in the amount of these minerals. In fact, in B244, pyroxene, and its alteration products, are almost completely absent. Most phenocrysts are euhedral and are either quite fresh (B243A) or completely pseudomorphed by serpentine-like and chloritic minerals (243 A & B). Where the pyroxene can be identified, it is diopsidic augite. Opaque iron ore minerals are grouped with ferromagnesian minerals and form individual phenocrysts and small grains that are evenly distributed throughout.

Only plagioclase microlites which give the rock a poor pilotaxitic texture, can be definitely identified in the groundmass.

Accessory minerals are apatite and sphene; calcite and the hydrous iron oxide are secondary. As neither quartz nor potash feldspar are in evidence, the rocks are best named andesites, although they are poor in ferromagnesian minerals for andesitic rocks.

One (field No. B240) of the other Toussaint Volcanics examined, is texturally and mineralogically similar to the type rocks, but contains fewer euhedral plagioclase phenocrysts, and ferromagnesian and iron ore minerals are less abundant. It contains a xenolith of basaltic rock (with intergranular texture) in which the plagioclase laths are turbid and most of the pyroxene has been altered to uralite and serpentine-like mineral.

Where fresh pyroxene remains, it is clear and diopsidic. Some of the pyroxene grains in the host andesitic rock are fresh, whereas others are completely altered. Opaque iron mineral is much more abundant in the xenolith than in the host rock.

Number B239 shows less hydrothermal alteration than B240 and the type specimens of Toussaint Volcanics; it has testural similarities, especially in that it is porphyritic and that the turbid groundmass contains numerous crudely oriented plagioclase microlites. However, both plagioclase and pyroxene phenocrysts are smaller than those in the type volcanics. All phenocrysts which are unaltered are euhedral, and those of plagioclase are zoned (from bytownite to andesine) irregularly cracked, and some have corrosion embayments. Only a few pyroxene phenocrysts of diopsidic augite are present. (Much less abundant than in the type rocks, except for 243B). The rock contains some brown hornblende phenocrysts which are as abundant as pyroxene phenocrysts. Iron ore is less abundant than in the type rocks, and serpentine-like material is associated with some of it, which is probably derived from pyroxene alteration.

Characteristics of the Mt. Devlin Volcanics.

(i) Three specimens (Field Nos. 230 A & B and B229) of the Mt. Devlin volcanics are very similar to the type rocks described from the Toussaint Volcanics. Thin sections of these are porphyritic and glomeroporphyritic; most phenocrysts (measure up to 3 mm. in diameter) are plagioclase, and are set in a turbid aphanitic groundmass that contains some indistinct relict plagioclase microlites flecked with feldspathic alteration products. Some plagioclase phenocrysts are strongly zoned; all are densely cracked, show turbid alteration in part, and may contain an individual zone replaced by chlorite. Four small epidote grains occur throughout.

There are also sub-euhedral phenocrysts of diopsidic augits (up to 1 mm. in diameter, but mostly to 0.5 mm.) and opaque iron ore (up to 0.5 mm. diameter). Some of the ferromagnesian minerals are pseudomorphed by serpentine-like and chloritic material (B229) and others also by uralite (B230A & B). However, a few unaltered diopsidic augite grains remain, some of which are rimmed by opaque iron ore. The hydrous iron ore in places occupies cracks in phenocrysts. The opaque iron ore is ilmenite which is evenly distributed throughout as phenocrysts and small grains, in some cases dusting the groundmass, a few grains are rimmed by sphene. Apatite forms a few small needles.

(ii) In remaining specimens of Mt. Devlin Volcanics (Field Nos. B226 a & b, B226c and B224) show more extreme hydrothermal alteration than group (i) and may be more acid types. They can be grouped in pairs.

Thin sections (Field Nos. B226 a & b) have poor pelotaxitic texture, and are porphyritic, (mainly in plagioclase. Turbid microlites in the groundmass are oriented, though indistinct in part owing to their alteration, and the fairly dense distribution of finely divided hydrous iron mineral. Such iron ore fills numerous cracks cutting the thin sections.

Most phenocrysts are oligoclase which show partial, or complete, turbid alteration; a few are unaltered or rimmed by albite. Most pyroxene has been replaced by almost colourless chlorite. However, ferromagnesian minerals are poor in the rocks, and apart from B226a, where a few small patches of alteration remain, these were apparently absent. A few apatite needles occur throughout, and in B226a some patches of mosaic quartz.

Thin sections (B226c & B224) show the effects of even more intense hydrothermal alteration, than that shown by the other specimens. Thin section B226c is porphyritic and glomeroporphyritic, whereas B224 is a heterogenous volcanic rock, composed of porphyritic rock fragments. The rock is iron stained, a result of the hydrothermal alteration, and "stained-rings" are common around the volcanic inclusions. Extensive movement of solutions transporting silica and calcite resulted in the formation of much matrix material of calcite, and of thin euhedral quartz crystals that form radiating groups. Many prismatic crystals elongated along their c-axes penetrate the calcite grains. The volcanic fragments are porphyritic (euhedral plagioclase phenocrysts), and, because of microlites in their groundmass, have a poor pilotacitic texture. They too show some replacement by calcite, and are extensively sericitized. In all cases the plagioclase phenocrysts are albite-oligoclase; ferromagnesian minerals were apparently eliminated by the hydrothermal alteration, though a few chloritic pseudomorphs can be seen. Most of the opaque iron ore is the hydrous form (staining is common), but some ilmenite also occurs. A few grains of apatite are present.

Comparison between Toussaint and Mount Devlin Volcanics

The Mount Devlin Volcanics (Nos. B230 a & b, & B229) are similar texturally and mineralogically to the type Toussaint Volcanics (Nos. B243 a & b, & B240), whereas some of the ferromagnesian poor rocks (Nos. B226A & B) are more like B244 of the Toussaint Volcanics, and appear to be more dacitic rather than andesitic. This may be due to the more intense hydrothermal alteration they have undergone, with the consequent chemical redistribution that has taken place. However, in no thin section were original quartz or potash feldspar phenocrysts seen, and as much of the groundmass composition is obscured by its fine grainsize and alteration, one must assume that the rocks are more likely to be andesitic than dacitic.

The petrological evidence indicates that specimens taken from these two groups of volcanic rocks could be part of the same volcanic suite. However, some specimens from the Mount Devlin Volcanics indicate the possibility that hydrothermal alteration was more extensive in the Mount Devlin area.

Report No. 19. 198A/1

7th May, 1962.

IDENTIFICATION OF A BROWN MINERAL FROM A GRANITE VEIN, OATES LAND ANTARCTICA.

by

G.J.G. Greaves

Introduction

A leucocratic granitic rock from the most western Aviation Island, Oates Land, Antarctica, was submitted by I.R. McLeod for petrological examination. The identification of a brown mineral which partly encloses a black flaky mineral, and the relationship between these two minerals was required.

Mineralogy.

Identification of the brown mineral by X-ray diffraction was inconclusive; it appeared to be a mixture of biotite with other minerals.

In thin section the black mineral was shown to be biotite, and the brown mineral is an intergrowth of fibrolite (a fibrous variety of sillimanite) with minor biotite. This intergrowth partly encloses flakes of biotite and muscovite.

The mineral composition of the rock and order of abundance in volume per cent is : -

Quartz	38%
Albite - oligoclase	10%
Orthoclase and minor microcline	22%
Mymekite	2%
Biotite	8%
Apatite	4%
Muscovite	2%
Fibrolite	12%
Tourmaline	1%
Opaque	1%
Epidote	very minor

The rock is a biotite-sillimanite-granite.

Report No. 20. 130ACT/2

7th May, 1962.

MINERALOGICAL EXAMINATION OF BORE CUTTINGS FROM D.D.H. 6C3 CANBERRA LAKES DAM SITE, A.C.T.

by

J.M. Rhodes

A sample of the bore cuttings from D.D.H. 6C3, Canberra Lakes Dam site, A.C.T., was submitted for mineralogical examination by E.K. Carter. The identity, relative abundance, and rounding of the mineral constituents was required, together with criteria for distinguishing between river gravel and brecciated material.

cont...

Report No. 20 (cont.)

The cuttings were embedded in plastic, and a thin section made, in order to enable a more positive identification of the mineral grains to be made.

The sample consists of about 80% volcanic fragments, together with about 20% quartz. The volcanic fragments are subrounded to subangular in shape; they are extremely altered and consist of a fine groundmass of quartz, chlorite and sericite, enclosing phenocrysts of quartz and feldspar. The feldspar phenocrysts are completely replaced by kaolinite and sericite, and many of the quartz phenocrysts are broken into angular fragments.

Quartz fragments are invariably angular; it is thought that they have been formed by fracturing of the phenocrysts.

The subangular to subrounded nature of the volcanic fragments, together with the unsheared porphyritic texture indicate that the cuttings are from river gravel and not from a fracture zone.

Report No. 21. 106Q4/1

7th May, 1962.

Petrographic Examination and Chemical Estimation of Iron in a Fossiliferous Shale from Mackay, Queensland.

by

G.J.G. Greaves.

Introduction

A brown fossiliferous shale, described as (?) sideritic limestone, was submitted by E.J. Malone for petrographic examination and chemical estimation of the iron content. The sample was collected from a locality 2 miles north east of Mt. Landsborough, near Mackay, Queensland.

Mt Landsborough 50 m S. Mackay

Petrographic Examination

The bulk of the rock consists of massive brown shale, the components of which are too small to be identified microscopically. A small amount of hydrated iron oxide is probably responsible for the brown colour of the rock.

The remainder of the rock consists of calcitic fossil remains which have been filled with the shale, quartz and calcite in various proportions. Quartz crystals are euhedral where the proportion of quartz to calcite is low; where the proportion is higher, a quartz mosaic is formed.

Discontinuous quartz calcite veins 0.8mm. wide cut the rock, these have a minor amount of an opaque mineral, possibly manganese oxide, concentrated in the shale adjacent to their borders.

Chemical Analysis.

J.R. Beevers determined the iron content as 7.58%; the residue after acid digestion is 19.4% of the rock.

Report No. 22

1069Q4/1
7th May, 1962.

PETROGRAPHIC AND MINERAGRAPHIC EXAMINATION OF AN ALTERED POROPHYRITIC RHYOLITE FROM BOWEN, QUEENSLAND.

by

G.J.G. Greaves.

Introduction

An altered porphyritic rhyolite (B51) with veins of a dark green mineral and a brown sulphide was collected by E.J. Malone from a locality five miles south of Hidden Valley Homestead, Bowen, Queensland. The nature and quantity of sulphide mineralization was required.

Mineragraphic Examination.

Sulphides form about 1% of the specimen. Of these pyrrhotite forms 95% and pyrite 5%.

The pyrrhotite which forms irregular grains up to 1 mm. in diameter and veins up to 1 mm. wide is confined to the veins of dark green mineral. Euhedral pyrite crystals up to 0.04 mm. in diameter are dispersed throughout the rock.

Petrological Examination

The rock consists of 10% quartz phenocrysts, 30% sanidine phenocrysts, 5% hornblende, 1% opaque sulphide, minor epidote and plagioclase, set in a fine grained groundmass of quartz, alkali feldspar and sericite

The quartz phenocrysts, which measure up to 5mm. x 3 mm. have been magmatically corroded, the sanidine phenocrysts, which measure up to 4mm. x 2 mm., have been extensively altered to kaolin and sericite. The hornblende, which is strongly pleochroic from dark green to light green and greenish brown forms veins up to 3mm. wide; it is the host mineral for the sulphides. The groundmass which has an average grainsize of 0.02 mm. shows no flow structures.

The rock is a hydrothermally altered porphyritic rhyolite.

Conclusion

The presence of hornblende, which is not usual in a rhyolite, as well as the alteration of sanidine to kaolin and sericite indicates that the rock has been through a period of secondary hydrothermal alteration.

Report No. 23.

79/N/1

1st June, 1962.

X-RAY SPECTROGRAPHIC ANALYSIS OF CLAY SAMPLES FOR POTASSIUM

by

S.C. Goadby and C. Rosser.

Seventy seven clay samples from the University of New South Wales Geology Department were analysed for potassium.

The samples were submitted by Dr. F. Loughnan.

POTASSIUM %

1	2.15	37	1.70	64	1.81
2	0.88	38	1.57	65	2.26
3	1.99	40	2.12	66	2.63
5	1.96	41	4.01	67	1.92
6	2.02	42	2.16	68	3.06
16	1.35	43	3.59	69	2.13
17	1.40	44	2.20	70	1.54
18	3.09	45	2.29	72	1.39
19	2.10	46	2.30	73	1.98
20	2.37	47	1.16	74	2.29
21	3.73	48	2.18	75	3.52
22	2.87	49	2.54	76	2.00
23	1.05	50	4.60	77	1.36
24	0.82	51	0.67	79	3.00
25	2.33	52	3.01	80	1.18
26	4.13	53	1.33	81	1.32
27	1.44	54	3.70	82	2.51
28	3.59	55	1.09	83	3.16
29	1.69	56	3.96	84	2.16
30	3.72	57	2.65	85	2.32
31	2.31	58	2.88	86	2.94
32	2.88	59	2.78	87	1.37
33	1.18	60	1.19	88	2.86
34	3.58	61	1.14	89	1.36
35	2.08	62	1.64	02/3	3.59
36	3.69	63	2.43		

Report No. 24 86NT4/A

8th June, 1962.

X-RAY SPECTROGRAPHIC ANALYSIS OF SAMPLES FROM RUM JUNGLE AREA.

by

S.C. Goadby.

Seven samples were submitted for uranium assay by R.N. Spratt of Territory Enterprises Pty., Ltd..

Sample No.	Uranium ppm.		Mean % U308
	1	2	
60205	187	192	0.0224
60228	244	249	0.0291
60236	234	240	0.0279
60239	238	252	0.0289
60243	247	268	0.0304
60244	277	286	0.0332
41890	62	62	0.0073

The samples all contain traces of thorium, in amounts up to roughly 10% of the uranium content and this appears to be the only reason why there could be a discrepancy between the radiometric and the chemical assays.

Report No. 25. 84 NT/1

14th June, 1962.

X-RAY SPECTROCHEMICAL ANALYSIS OF AMPHIBOLITE SAMPLES FROM THE RUM JUNGLE AREA.

by

S.C. Goadby.

Two samples were submitted by B.P. Ruxton for Pb, Cu, Co and V determination. The samples, from the Rum Jungle Area, N.T., were numbered 195201, and 195202.

X-ray spectrochemical analysis results are:-

p.p.m.

Sample	Pb	Cu	Co.	V
195201	100	200	Trace	150-250
195202	100	500-700	Trace	300-500

Report No. 26.

79N/1
14th June, 1962.

IDENTIFICATION OF CLAY MINERALS FROM GRIFFITH, N.S.W.

by

S.C. Goadby.

The three samples submitted by E.G. Wilson were:-

(1) A surface sample.
(2) Soil profile sample.
(3) Clay from depth of 120 ft. in bore ref. 387,296 (Bungendore 1:50,000 sheet)

X-ray diffraction shows samples (1) and (3) to be mainly silica with some Kaolinite.

Sample (2) is illite.