ICI AUSTRALIA LIMITED - AUSTRALIAN FERTILIZERS LIMITED

EXPLORATION LICENCE 1125

MOUNT DRUMMOND (Mittebah)

RELINQUISHMENT REPORT

MOUNT ISA

February 1977

D. O'N. HACKETT

CR 77/39

CONTENTS

ICI Australia Limited

PROJECT: F.L - ICI PHOSPHATE JOINT VENTURE -

TITLE: LOCALITY PLAN

Mittebah EL 1125

SURVEY	SCALE	PLAN NO	CHECKED
ACO	1:2,500,000		
DRAWN	DATE		DATE
E M	17-2-77		

1. SUMMARY

Exploration Licence 1125 - Mt. Drummond (Mittebah) was granted by the Northern Territory Administration to ICI Australia Limited and Australian Fertilizers Limited for a 12 months term commencing 12th May 1976.

The area comprised some 1165 square kilometres (450 sq. miles) and is located close to the Queensland border some one hundred and twenty kilometres N.N.E. from Camooweal.

The Exploration Licence was taken out to explore for deposits of high grade phosphate on the northern shelf of the Georgina Basin. The search was concentrated on the Lower Middle Cambrian Burton Beds - a biostratigraphic unit equivalent to the phosphatic Beetle Creek and Border Waterhole Formations in Queensland.

Between the date of granting the licence and September 1976, the area was geologically mapped primarily by aerial photograph interpretation at a scale of 1:100,000 and seven drill holes for 381 metres were sunk in previously untested parts of that zone, which was inferred as a possible host to phosphate mineralisation. Trace phosphate was found in two holes and none was found in the others.

It was concluded that the area was devoid of economic phosphate mineralisation. The Licence was relinquished in November 1976.

2. EXPENDITURE

Exploration expenditures to the end November 1976 totalled $8215 comprised as follows:

Labour and Consultants		2630
Contract Draughting		79
Sampling		-
Earthmoving	)	4045
Drilling	)	
Supplies and Miscellaneous		561
E.L. Rental		900
		$8215

..2.

3. PREVIOUS INFORMATION

The regional geology of the area has been mapped and summarised by the Bureau of Mineral Resources on 1:250,000 series E/53-12 Mt. Drummond (1963).

Between July 1967 and September 1968, Mines Exploration Pty. Ltd., under Prospecting Authority 1776, mapped and drilled 21 rotary drill holes in the area covered by Cainozoic sediments forming a seasonal swamp between the Proterozoic rocks of the Carrara Range to the north and the Camooweal Dolomites of the Barkly Tableland to the south, which was indicated as being underlain by lower Middle Cambrian Burton Beds.

Of the 21 holes drilled by M.E.P.L. only one - PDHM 10 - intersected phosphatic sediments of low grade in the basal part of the Burton Beds; the other drill holes establishing widespread clastic sedimentation in the Burton Beds - an unfavourable environment for phosphate deposition. The phosphate located in PDHM 10 was interpreted as being restricted to a gentle Basement high near the Middle Cambrian shore line. The best phosphate intersection was between 170 and 172.5 feet for 11.8% P_2O_5 in a total phosphatic section from 152.5 and 202.5 feet.

The present programme was designed to test the area within 2-3 kilometres of PDHM 10 and an untested area closer to the Queensland border north of Carrara Waterhole.

4.0. GEOLOGY

The stratigraphic succession established in the area;

CAINOZOIC	- Czs -	sand, laterite
	- Czb -	Black soil
	- unconformity -	
MESOZOIC?	- M -	Siltstone and sandstone
	- unconformity -	
MIDDLE CAMBRIAN -	BURTON BEDS - Cmb -	Siltstone, chert, sandstone
	CAMOOWEAL DOLOMITE - Cmd -	Dolomite, limestone
LOWER CAMBRIAN?	- Cl -	Sandstone and siltstone
	- Unconformity	
LOWER PROTEROZOIC	- Pl -	Undifferentiated

4.1. LOWER PROTEROZOIC

No work was done on the Lower Proterozoic sequence which outcrop along the northern boundary of the E.L. They are clearly mappable as such from aerial photographs, showing strong surface lineations.

4.2. LOWER CAMBRIAN

Possible Lower Cambrian rocks were intersected in drill hole M-7-76. No outcrops were observed. The drill cuttings comprised claystone and shale lying below very weakly phosphatic Middle Cambrian rocks.

4.3. MIDDLE CAMBRIAN

4.3.1. Burton Beds

The Burton Beds do not outcrop within the Exploration Licences but do so quite extensively to the west and south west. The rocks are predominantly siltstone and chert in the outcrops, but appear from drill-hole evidence to become calcareous and sometimes sandy towrads the base. They are frequently very weakly phosphatic in the exploration area and elsewhere. In the E.L. the Burton Beds are covered by Cainozoic sands and laterite.

4.3.2. Camooweal Dolomite

Camooweal Dolomite outcrops in the eastern side of the area where the country is more dissected in the Carrera Creek drainage system. The rock is essentially Dolomite with chert lenses. Over the bulk of the E.L. the Camooweal Dolomite is covered by black soils.

4.4. MESOZOIC

Mesozoic - probably Cretaceous rocks - may occur in the area overlying the Burton Beds. Positive identification has not been made but a section in drill hole M-1-76 has been so interpreted. Mesozoic rocks do not outcrop in the E.L. but do occur to the north and east, unconformably on Lower Proterozoic rocks.

4.5. CAINOZOIC - RECENT

Superficial deposits fall into two groups. Black soil over-lies the Camooweal Dolomite in the south of the E.L., and sands, silts and

gravels with isolated laterites overlie the Burton Beds in a belt across the north end central portions. This sandy alluvial area is flooded during the rainy season.

5. DRILLING

Seven rotary/percussion holes for 318 metres were drilled in the area during August 1976. The holes were drilled by Rotary Drilling Pty. Ltd., using a rig of their own design. The holes and total depths are tabulated below (Coordinates: Australian Map Grid 1966):-

Drill Hole No.	T.D. Metres	Collar Co-ordinates Metres N	Metres E
M-1-76	40	7931000	740100
M-2-76	60	7934000	743000
M-3-76	38	7928800	746500
M-4-76	47	7929200	747500
M-5-76	6	7922000	795000
M-6-76	32	7923700	794000
M-7-76	35	7927100	791300

Drill cuttings were collected at 1 metre intervals throughout each drill hole. The samples were spot-tested for phosphate using an acid solution of ammonium vanado-molybdate (AVM). In the event only very weak indications of the presence of phosphate were obtained and none of the samples were retained for detailed analysis. Results of the spot-testing are recorded on the drill logs (Appendix 1) as either +ve AVM or -ve AVM.

6. RESULTS OF EXPLORATION

The first four holes drilled, M-1-76 to M-4-76, were sited to test within two kilometres of Hole PDHM 10 drilled by Mines Exploration Pty. Ltd. Three of the holes intersected Burton Beds containing very weakly phosphatic material. One hole, M-2-76, was stopped in Cainozoic sediments at 60 metres.

The other three holes, M-5-76 to M-7-76, were sited to examine a section north of Carrera Waterhole that was previously untested.

The section apparently covered the range of off shore sedimentary facies from Lower Cambrian to Camooweal Dolomite. The indications of phosphate were however completely negative.

7. CONCLUSIONS

The exploration programme indicated that the phosphate mineralisation located in POHM 10 was of extremely localised extent, whilst the eastern section was shown to be non-phosphatic.

It is concluded from the exploration that the area has no potential for an economic phosphate deposit.

The Exploration Licence was relinquished in November 1976.

APPENDIX

DRILL HOLE LOGS

ICI Australia Limited

DRILLING DATA SHEET

HOLE No. M1

Area E.L. 1125 Mt. Drummond (Mittebah)

Project Code NT 13

Plan Ref .....

Contractor Rotary Drilling

Started 7-8-76

Drill Drillmatic

Method Rotary 0-14
Hammer 14-40

Finished 7-8-76

Petrographic Rep .....

Total Depth 40 metres

Assay Rep .....

Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0 2 5 10 20 / 2 5 10 20 +	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	0.2	Cz	Sandy soil.							
0.2	10		Yellow sandy clay with Fe/Mn nodules.							
10	13	M	Yellow brown siltstones.							-ve AVM
13	14		Siltstone and gravel.							
14	14.5		Conglomerate with sand and silt.							
14.5	15	Gmb	Chert							-ve AVM
15	17		Siltstone and chert.							
17	23.5		Siltstone and trace chert.							
23.5	27		Siltstone + 10% black chert.							-ve AVM
27	28		White sandy siltstone.							V. weak -ve AVM.
28	31		Calcareous siltstone.							
31	33		Calc. siltstone and non-calc. siltstones.							
33	40		Dolomite.							V. weakly +ve AVM.

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DRILLING DATA SHEET

HOLE No. NS

Area E.L. 1125 Mt. Drummond (MITTEBAH)

Project Code NT 19

Plan Ref .....

Contractor Rotary Drilling

Started 7-8-76

Drill Drillmatic

Method Rotary 0-42
Hammer 42-60

Finished 7-8-76

Petrographic Rep .....

Total Depth 60 metres

Assay Rep .....

Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0–2	2–5	5–10	10–20	20+	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	0.3	Cz	Sandy soil											
0.3	5		Orange lateritic clay.											
5	11		Yellow sandy clay.											
11	13		Clayey grit.											
13	27		Gravelly sand.											
27	33.5		Red brown siltstone.											-ve AVR
33.5	34.5		Pink sandstone.											
34.5	35.5		Silty gravel.											
35.5	41.5		Sandstone.											
41.5	43		Silcrete.											
43	60		Sandy siltstone.											-ve AVR

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DRILLING DATA SHEET

HOLE No. M3

Area E.L. 1125 Mt. Drummond (MITTERAH) Project Code NT 13

Plan Ref ..... Contractor Rotary Drilling P/L Started 8-8-76

Drill DRILLMATIC Method Rotary Finished 8-8-76

Petrographic Rep ..... Total Depth 39 metres

Assay Rep ..... Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0-2	2-5	5-10	10-20	20+	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	2	Cz	Red sandy soil.											
2	7		Sandy clay.											
7	8		Red sandy kaol-initic clay.											
8	12		Yellow clay and sand.											
12	20		Brown, red and white silty clay.											
20	21.5		Chert gravel, silt and clay.											
21.5	23		Silcreted gravel.											
23	24		Quartz and chert gravel.											
24	32	6	Chert and clay.											-ve ANA.
32	36.5	6	Siltstone and chert.											-ve ANA.
36.5	38	6	Dolomite.											-ve ANA.

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DRILLING DATA SHEET

HOLE No. M

Area E.L. 1125 Mt. Drummond (MITCHAM)

Plan Ref .....

Drill DRILLMATIC

Petrographic Rep .....

Assay Rep .....

Contractor Rotary Drilling

Method Rotary

Project Code NT 13

Started 6-8-76

Finished 8-8-76

Total Depth 47 metres

Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0-2	2-5	5-10	10-20	20+	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	1	Cz	Sand.											Water at 1m.
1	5		Lateritic, nodular sand and soil.											Water at 3m.
5	7		Clay and gravel.											Water at 5m.
7	15		Clay.											
15	19.5	E ?	white siltstone.											-ve Alk.
19.5	20		Claystone.											-ve Alk.
20	33	Emb	Claystone and chert (5%).											-ve Alk.
33	44		White siltstone and chert.											-ve Alk.
44	45		" " " "											-ve Alk.
45	46		" " " "											-ve Alk.
46	47		" " " "											-ve Alk.
			Hole abandoned - due to water from the top of the hole.											

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DRILLING DATA SHEET

HOLE No. M 5

Area E.L. 1125 Mt. Drummond (MITTESAH)

Project Code NT 13

Plan Ref .....

Contractor Rotary Drilling P/L

Started 12-8-76

Drill DRILLMATIC

Method Rotary

Finished 12-8-76

Petrographic Rep .....

Total Depth 6 metres

Assay Rep .....

Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0–2	2–5	5–10	10–20	20+	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	2	Cz	Black soil and clay.											
2	3	G	Limestone and chert.											
3	6		Dolomite.											

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DRILLING DATA SHEET

HOLE No. M 6

Area E.L. 1125 Mt. Drummond (MITTEBAH) Project Code NT 13

Plan Ref ..... Contractor Rotary Drilling P/L Started 12-8-76

Drill DRILLMATIC Method Rotary 0-16m. Hammer 16-32m. Finished 12-8-76

Petrographic Rep ..... Total Depth 32 metres

Assay Rep ..... Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0-2	2-5	5-10	10-20	20+	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	5	Cz	Brown sandy soil.											
5	8		Orange brown clay with chert.											
8	16.5	6	Cherty pale siltstones.											-ve Adm.
16.5	20		Yellow siltstone.											-ve Adm.
20	23		Fine sandstone.											
23	24		Siltstone and chert.											-ve Adm.
24	27		Shale, siltstone, chert.											
27	28		Siltstone and shale.											-ve Adm.
28	29.5		Limestone.											-ve Adm.
29.5	30.5		Chert and siltstone.											
30.5	32		Limestone/ dolomite.											

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DRILLING DATA SHEET

HOLE No. M.7

Area E.L. 1125 Mt. Drummond (MITTEBAH) Project Code NT 13

Plan Ref ..... Contractor Rotary Drilling P/L Started 12-8-76

Drill DRALLMATIC Method Rotary Finished 12-8-76

Petrographic Rep ..... Total Depth 35 metres

Assay Rep ..... Logged by D. Hackett

SAMPLE INTERVAL metres FROM	TO	STRATIGRAPHY	LITHOLOGY	SHAPIRO FIELD TEST (% P_2O_5) 0 2 5 10 20 / 2 5 10 20 +	A.F.L. ASSAYS (%) P_2O_5	Fe_2O_3	AL_2O_3	CO_2		PETROGRAPHY RESULTS AND COMMENTS
0	5.5	Cz	Red sand.							
5.5	15		Red sand and gravel.							
15	20		Red/brown clay.							
20	31	Gm	Siltstone and shale.							
31	35	Gl	Red sand and clay.							

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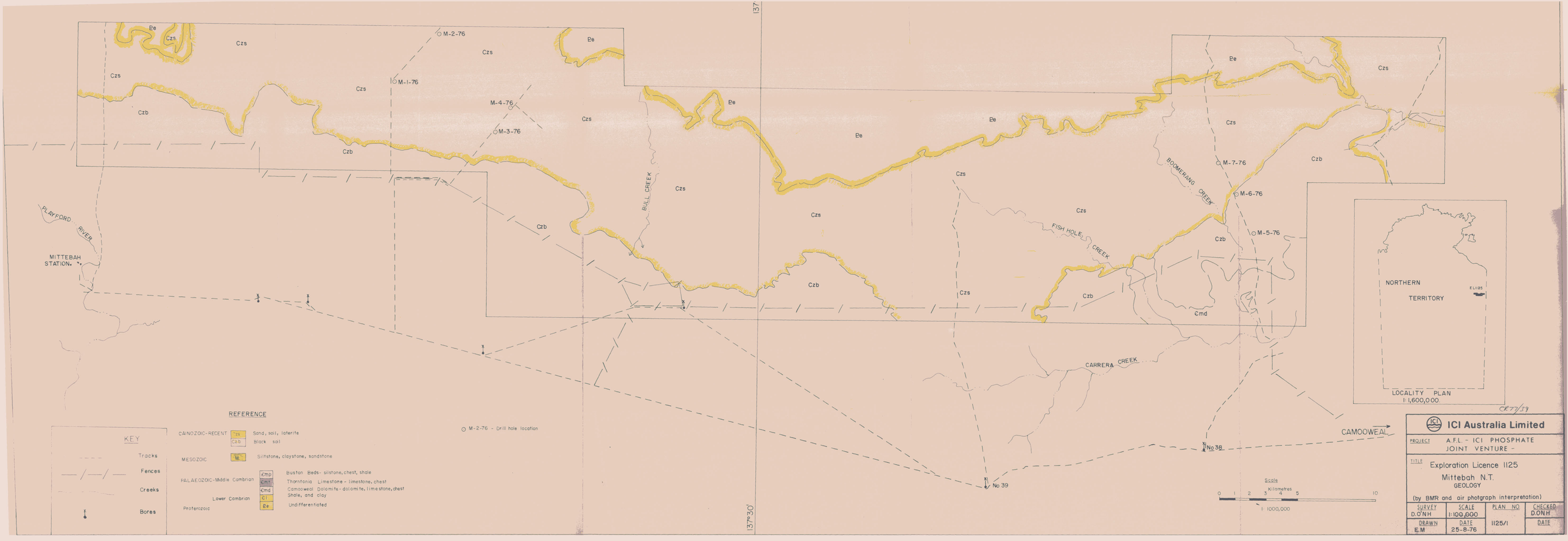
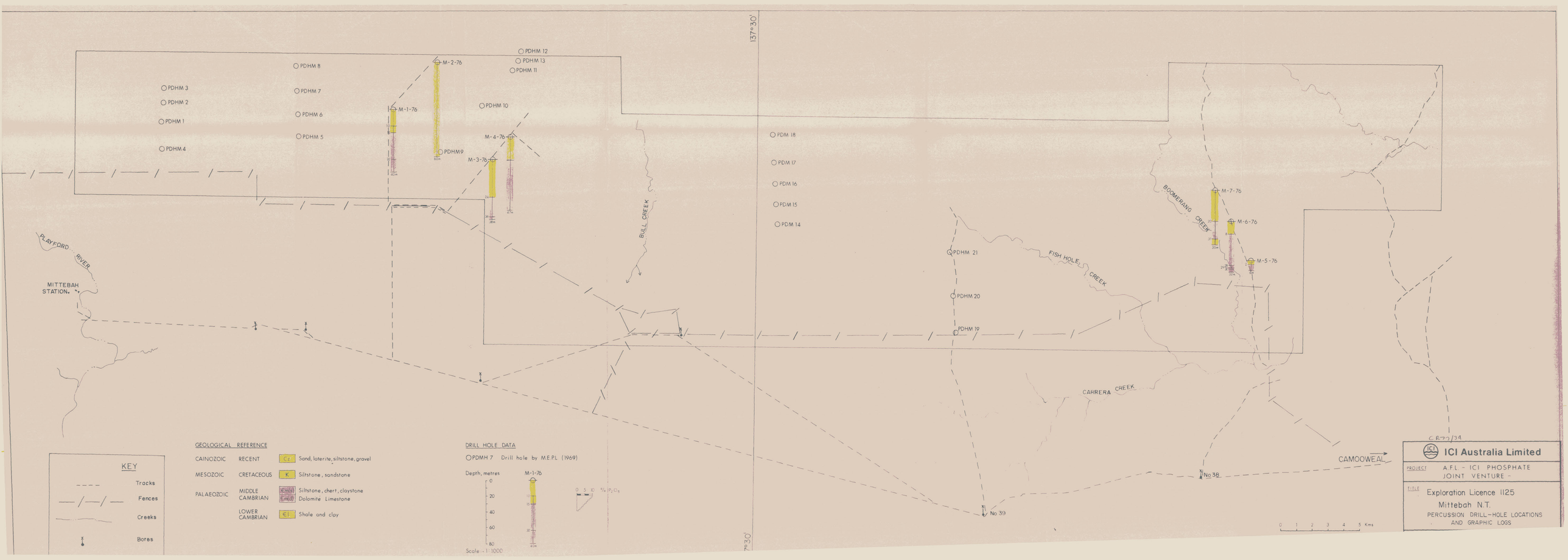

137°
137°30'
Pe
Czs
Czb
Cmd
M-2-76
M-1-76
M-4-76
M-3-76
M-7-76
M-6-76
M-5-76
BULL CREEK
BOOMERANG CREEK
FISH HOLE CREEK
CARRERA CREEK
PLAYFORD RIVER
MITTEBAH STATION
CAMOOWEAL
No 39
No 38
NORTHERN TERRITORY
EL1125
LOCALITY PLAN
1:1,600,000
KEY
Tracks
Fences
Creeks
Bores
REFERENCE
CAINOZOIC-RECENT
Sand, soil, laterite
Black soil
MESOZOIC
Siltstone, claystone, sandstone
PALAEOZOIC-Middle Cambrian
Buston Beds- siltstone, chest, shale
Thorntonia Limestone - limestone, chest
Camooweal Dolomite - dolomite, limestone, chest
Lower Cambrian
Shale, and clay
Proterozoic
Undifferentiated
M-2-76 - Drill hole location
Scale
Kilometres
1:1000,000
CR77/39
ICI Australia Limited
PROJECT A.F.L. - ICI PHOSPHATE JOINT VENTURE -
TITLE Exploration Licence 1125
Mittebah N.T.
GEOLOGY
(by BMR and air photograph interpretation)
SURVEY D.O'NH
SCALE 1:100,000
PLAN NO 1125/1
CHECKED D.O'NH
DRAWN E.M
DATE 25-8-76
DATE


137°30'
7°30'
PDHM 12
PDHM 13
PDHM 11
PDHM 8
PDHM 7
PDHM 6
PDHM 5
PDHM 3
PDHM 2
PDHM 1
PDHM 4
M-2-76
M-1-76
PDHM 10
PDHM9
M-4-76
M-3-76
PDM 18
PDM 17
PDM 16
PDM 15
PDM 14
BULL CREEK
PLAYFORD RIVER
MITTEBAH STATION
PDHM 21
PDHM 20
PDHM 19
FISH HOLE CREEK
BOOMERANG CREEK
M-7-76
M-6-76
M-5-76
CARRERA CREEK
CAMOOWEAL
No 38
No 39
KEY
Tracks
Fences
Creeks
Bores
GEOLOGICAL REFERENCE
CAINOZOIC RECENT Cz Sand, laterite, siltstone, gravel
MESOZOIC CRETACEOUS K Siltstone, sandstone
PALAEOZOIC MIDDLE CAMBRIAN Cm(s) Siltstone, chert, claystone
Cm(d) Dolomite Limestone
LOWER CAMBRIAN €l Shale and clay
DRILL HOLE DATA
PDMH 7 Drill hole by M.E.P.L. (1969)
Depth, metres
M-1-76
0 20 40 60 80
0 5 10 % P_2O_5
Scale - 1:1000
0 1 2 3 4 5 Kms
C.R. 77/39
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TITLE Exploration Licence 1125
Mittebah N.T.
PERCUSSION DRILL-HOLE LOCATIONS AND GRAPHIC LOGS